CONFIDENTIAL REPORT OF CONFERENCE OF MEN
REPRESENTING U. S. DEPARTMENT OF AGRICULTURE,
STATE EXPERIMENT STATIONS AND THE INSTITUTE
OF AMERICAN MEAT PACKERS, ENGAGED IN SOFT
PORK INVESTIGATIONS HELD IN ATLANTA, GEORGIA
MAY 5, 6 AND 7, 1925.

Names of men in attendance

Stations

Alabama.....	Mr. Salmon
Georgia	Mr. Edwards
"	Mr. Morgan
Iberia, La. U. S. D. A.	Mr. Quesenberry
Indiana	Mr. Vestal
Mississippi	Mr. Templeton
North Carolina	Mr. Hostetler
South Carolina	Mr. Starkey
" "	Mr. Du Rant
Tennessee	Dr. Jacob
Virginia	Mr. Cocke
U. S. Department of Agriculture...	Mr. Russell
" " " " ...	Mr. Hankins
" " " " ...	Mr. Ellis
" " " " ...	Dr. Cole

Packers

Swift & Company	Mr. Ferguson
" " "	Mr. McDowell
Armour & Company	Dr. Ellinger
Institute of American Meat Packers	Mr. Anderson

Mr. Russell:

Another year has rolled around since our last meeting and you all know that there has been considerable more work completed during this past year than during any other year of the work. I think it will be gratifying to all of you, it is to us, to know that at least one more station is planning to be in the coming year and that is Virginia. They are really in the heart of the soft-pork country. The Virginia people are going to come in and Director Drinkard told me that they were ready to use about 20 breeding sows to farrow two litters a year and they will be glad to take up any part of the work assigned. They can raise peanuts, soybeans, corn, sweet potatoes, alfalfa and other crops.

Another phase of the work we are undertaking that has never been done before is continuous feeding of green alfalfa and that work is to be done in California. Strangely enough the California station at Davis is the only experiment station in the country that can pasture alfalfa continuously. They have irrigation so they can turn on the water when necessary, consequently have 12 months in the year pasture season. They have six sows to farrow this spring at Davis with which to start the work. They have been on alfalfa pasture since they were bred. We expect to select sow pigs from these litters and continue right along, finishing the pigs on corn and tankage, barley and tankage or whatever feed is usually fed out there, using check lots to get the difference if any in the quality of pork produced.

Pennsylvania is now in the work and carried 40 hogs this year. Arkansas also had about 40 hogs. Although neither of these stations could send representatives to the meeting, they expect to continue in the work.

There are a few men here who have not been at any of our meetings heretofore. I will say for them that we have each station report the work they have done during the past year. We follow the plan of round table discussion and it is the privilege of any one to ask any question that pertains to the work. Do not wait until the session is over. Ask your question when the subject is being discussed. These meetings are of course confidential to those interested in the work. We always invite the packers who are interested and the Institute of American Meat Packers who have taken an active part in the work. Mr. Ferguson has been with us at most of our meetings and Dr. Ellinger was with us last year. The Institute of American Meat Packers was represented last year by Mr. Anderson and we are glad to have him with us again this year.

This completes five years of our soft-pork investigations. I do not doubt but that a good many of us thought 5 years would find it completed. All of you know how far we are from completion. I can not help but recall the remark Mr. Ferguson made to me at the original meeting at Auburn, Alabama. In part he said "You undertake this work and it will take you 10 years before you get through." I thought that was a long while but it is not so far away now. In the last 5 years we have slaughtered approximately 3500 head of hogs in this work. It looks like we should

know more than we do at the present time in the way of positive results but as I look back I question very much whether we would change our plans of procedure if we had it to do over again. We have done a lot of things that did not tell us very much and we have found a good many negative results. They have been mighty important.

Soybeans have come into this work to a very great extent due to the fact that they are raised in practically all parts of the United States, making the problem a national one. As you gentlemen know we have determined and published the fact that soybeans alone or with a 2-1/2 per cent ration of corn for 8 weeks on 100 pound pigs make soft and sometimes oily hogs. Just to what extent the farmers are feeding soybeans is undetermined. Just to what extent soybeans might be fed with certain proportions of corn is yet to be determined and then there is the biggest problem of all in my opinion, in the soybean question, that of hogging down corn and soybeans and in that connection what proportion of beans to corn do hogs consume. I presume most of you are better posted on the soybean question than I but I frankly confess I was somewhat surprised at a meeting we had in Washington not very long ago in which a representative from the Bureau of Plant Industry was present and stated that varieties of soybeans contained all the way from 12 to 24 per cent of oil and that further there were something in the neighborhod of 20 varieties that were used in the corn belt and that there was not much probability of that number being reduced. I was hoping that the number could be reduced to about 4 or 5 varieties so that we could get the facts a good deal better and easier.

The palatability of the soybean enters into this work to a considerable extent. If the hogs like them and consume a large proportion of beans to corn the chances are very much greater for a soft product. For these reasons the soybean question is entering into our work to a greater extent than ever and there are some questions connected with the feeding of soybeans that need to be taken up and very carefully considered. I hope that some positive conclusions may be reached and agreed upon at this meeting. I might say that the question is up as to putting out a press notice to the farmer with a word of caution as to results that may be obtained by feeding soybeans. We will take this question up later in the meeting for determination by the members of this conference.

We will follow the usual plan of having the station men report first and Mr. Hankins will follow on some summaries in each line. Mr. Hankins has made a tentative outline of the plan we will follow. The first subject we will take up will be that of feeding peanuts to hogs followed by a hardening period of a combination of feeds by the Alabama Station. We will first hear from Mr. Salmon on the work that has been conducted during the past year at the Alabama Station.

Mr. Salmon:

Our work this year was a test of feeding peanuts in dry lot to hogs weighing approximately 45 pounds at the beginning of the test for a six

weeks period followed by a hardening period, using 5 parts corn and 1 part peanut meal self fed with mineral mixture, free choice.

ALABAMA EXPERIMENT 1924 - 25.

Last year we reported that hogs started at an initial weight of about 80 pounds and finished to a weight of 200 pounds or more on a ration of 5 parts of corn and 1 part of peanut meal killed hard or medium hard. These hogs had not received any softening feeds prior to starting on experiment.

This year we are feeding the same ration to hogs that received peanuts for 6 weeks before the beginning of the period of feeding on corn and peanut meal.

Twenty-four hogs averaging 46.4 pounds each received Spanish peanuts in self feeder for 42 days. Table 1 shows the feed and gains during this period.

TABLE 1

SUMMARY OF FEED AND GAINS
PEANUT PERIOD

December 23 to February 3 - 42 days.

No. of Hogs	24
Initial weight of lot	1115.4
Final weight of lot	2295.0
Total gain	1179.6
Av. initial weight	46.4
Av. final weight	95.6
Average gain	49.1
Av. daily gain	1.17
Feed consumed	
Peanuts	4176.6
Mineral mixture*	102.0
	4278.6
Feed for 100 Lbs. gain	
Peanuts	354.0
Mineral mixture	8.6
	362.6

*The mineral mixture was Steamed Bone meal 25 Lbs., Marble dust 25 Lbs., Salt 25 Lbs., Charcoal 25 Lbs., and Kl 4 ounces.

Four hogs were slaughtered at the close of the peanut period and 20 were placed on corn 5 parts, and peanut meal 1 part, self fed, with mineral mixture, free access.

They were continued on this ration for 8 weeks when 6 of the heaviest hogs were slaughtered. Table 2 shows the feeds and gains during this period.

TABLE 2

SUMMARY OF FEED AND GAINS
FIRST PEANUT MEAL PERIOD

February 3 to March 31 - 56 days

No. of hogs		19*
Initial weight of lot		1795
Final weight of lot		3250
Total gain		1455
Average initial weight		94
Average final weight		171
Average gain		77
Average daily gain		1.37
Feed consumed		
Corn (ground)		4740
Peanut meal		948
Mineral Mixture		198
	Total	5886
Feed for 100 Lbs. gain		
Corn (Ground)		325.8
Peanut meal		65.1
Mineral mixture		13.6
	Total	404.5

*One removed during this period and correction in feeding data was made.

TABLE 3

INDIVIDUAL WEIGHTS AND GAINS OF HOGS SLAUGHTERED

Hog No.	Initial weight	Gain on Peanuts	Gain on corn and P.N:meal	Final Wt.	R.I. Back fat
4	40.6	54.4		95	1.4627
14	66	79		145	1.4628
20	41.6	48.4		90	1.4627
31	52	33		85	1.4629
	50	53.7		104	1.462800
0	47	63	110	220	1.4607
1	52.6	52.4	112	217	1.4609
1 Tam	47.6	62.4	80	190	1.4609
5	48.3	56.7	100	205	1.4602
6	68.6	71.4	120	260	1.4606
13	65	80	105	250	1.4607
	54.8	64.3	104.5	223	1.460700

Table 3 shows the individual weights and gains of the hogs slaughtered. The 4 hogs slaughtered at end of the peanut period had an average initial weight of 50 pounds made an average gain on peanuts of 53.7 pounds or 107.4 per cent of the initial weight. They were oily with an average refractive index of 1.4628. The 6 that received corn and peanut meal for 8 weeks following the peanut period had an average initial weight of 54.8 pounds and made an average gain on peanuts of 64.3 pounds or 117 per cent of the initial weight. They made an average gain on corn and peanut meal of 104.5 pounds or 87.3 per cent of the average weight at the close of the peanut period. The gain on peanuts represented 28.7 per cent of the final weight. These hogs killed soft with an average refractive index of 1.4607. This showed that considerable hardening had occurred during the 8 weeks on corn and peanut meal but not sufficient to make them commercially hard carcasses.

The remainder of the hogs will be slaughtered later.

Mr. Russell:

Are there any questions?

I just suggested to Mr. Hankins that I think it would be a good plan to give us the grade limits of refractive index.

Mr. Hankins:

The grade limits of refractive index (back fat) are as follows:

Hard	1.4597 and below
Medium hard	1.4598 to 1.4601
Medium soft	1.4602 to 1.4605
Soft	1.4606 to 1.4618
Oily	1.4619 and above

Mr. Russell:

Last year as you recall we talked about the bulletin. I suppose we all thought we would have it in print and circulated by this time. I know all of you men at the various stations have gotten a copy of the proposed bulletin. Mr. Ferguson was not here last year and probably does not know about the bulletin but we are getting out a bulletin on the work up to date covering 5 years work. We hope it is going to be something worth while. Incidentally it is the first attempt made by any bunch of experiment station men to get up a joint bulletin. It seems to be meeting with very good success and I rather think that it is setting a precedent that will be helpful in other lines of experimental work where State men and Government men can actually get together and settle a problem with a minimum amount of work. We want to take up the text of this bulletin before we adjourn. We feel this should be rushed along as rapidly as possible. I just mention this now so that you may be ready to discuss it when it is taken up.

Mr. Ellis, of course, will discuss the chemical work on all of these experiments later in the meeting.

Mr. Ferguson:

Have you an extra copy of this bulletin?

Mr. Russell:

Mr. Ellis will lend you his copy.

Mr. Russell:

Mr. Hostetler will now take up the work of the North Carolina Station.

Mr. Hostetler:

The thing I had in mind in taking up this phase of the work was that last year we started with 65 pound pigs which was of lower weight than any work that had been done before and we expected better results and received better results last year from using the lighter pigs. I do not know whether anybody else thought so or not but I expected even better results this year than we had last year. I think the trouble this year is because of the pigs. I might say right at this time as far as all of our work is concerned I feel that a lot of work that has been done before we started the cooperative work and since we started has not been satisfactory, due entirely to

the physical condition of the pigs. I think that is probably the reason why our experiment this year is not satisfactory. It is not satisfactory to me at all. I hope it will be possible for us to continue it again next year. Last year our pigs gained 1.33 on peanuts and on hardening feeds the average daily gain was 1.96. This year our average daily gain was .68 of a pound and .97 on corn and 1.09 on the brewers' rice lot.

Mr. Russell:

Mr. Hostetler, I would like to ask you if, when you got these better results last year you fed the whole peanuts or the shelled nuts?

Mr. Hostetler:

We fed practically the same peanuts, - shelled nuts, a by-product from the peanut factory. We had some abortions among our sows.

Mr. Russell:

What were your sows fed at the time of abortion?

Mr. Hostetler:

They were being fed the same as usual. The only thing I could contribute it to was that we had sowed some rye the previous fall and after they had weaned their spring litters, we turned them out in this field and just let them range over there. Wet weather and other work kept us from turning the rye under and seeding it that spring. I think that the rye possibly caused the abortion. Several of the same sows are still in the herd and farrowed normally this spring.

Mr. Russell:

The reason I ask the question is that we had some similar results in one lot of sows. There were 8 sows we were carrying on peanuts prior to being bred and during gestation. We fed these sows shelled nuts and we had 6 of them abort. We could not find any contagious abortion. If any of you gentlemen had any experience in feeding these shelled nuts to sows during gestation will you give us your opinion?

Mr. Hostetler:

These sows had had practically no peanuts at all. They might possibly have had a little.

The following table shows our results in this experiment as far as it has gone.

RESULTS FROM COOPERATIVE SOFT PORK EXPERIMENT

1924 - 1925

A- Softening Period December 29, 1924 - February 20, 1925 - 56 days

Table I

No. of Pigs	Ration	Ave. Int. Weight	Ave. Final Weight	Ave. Gain per Pig	Ave. Da. Gain	Feed per Cwt. Gain: Peanuts	Feed per Cwt. Gain: Mineral	Com. Report: No.	Com. Report: Grade	Refr. Index
33	Peanuts Mineral	36.8	73.7	36.9	.68	307	2.2	2	S	1.4629 1.4632

B- Hardening Period February 20 to April 17, 1925 - 56 days.

Table II

Lot No.	Ration	Ave. Int. Weight	Ave. Final Weight	Ave. Gain A	Ave. Gain B	Average Daily Gain
1	CORN F.M-Min.	82.3	136.8	43	55	.97
2	B. Rice F.M.-Min.	82.2	143.5	46	60	1.09

C- Slaughter Data

Lot No.	Pig No.	Days on Feed A	Days on Feed B	Int. Wgt.	Final Weight	Gain A	Gain B	Committee Grade	Refrac. Index
Check	3	--	--	33	--	-	-	Soft	1.4613
"	10 - 30	--	--	59	--	-	-	Soft	1.4611
"	26 - 16	--	--	64	--	-	-	Soft	1.4609
Peanuts	3	56	--	30	74	44	-	Soft - Oily	1.4629
"	32	56	--	35	86	51	-	Soft - Oily	1.4632
1	2	56	56	41	114	36	37	Soft	1.4620
1	19	56	56	61	224	74	89	Soft	1.4610
1	33	56	56	30	133	38	65	Soft	1.4602
2	22	56	56	43	155	77	35	Soft	1.4610
2	41	56	56	34	115	26	55	Hard	1.4590
2	44	56	56	29	152	43	80	Medium Hard	1.4591

Mr. Russell:

Mr. Hankins have you anything to add?

Mr. Hankins:

I believe not.

Mr. Russell:

The next one is along the same line at Beltsville. Mr. Hankins will make that report.

Mr. Hankins:

The experiment along this line conducted at Beltsville was started with the pigs weighing approximately 40 pounds. The original plan called for 8 weeks feeding on peanuts to be followed by 20 weeks on corn with tankage. The gains made during the 8 weeks of peanut feeding were so low that it was decided to continue the feeding of peanuts another 4 weeks. That was done with the pigs divided into 2 lots during the last 4 weeks, 1 lot being self-fed tankage with the peanuts and the other lot continued as before. The 3 check pigs had an average live weight at slaughter of 41 pounds. Two were graded soft and 1 medium-soft and the average refractive index was 1.4608. At the close of the 12-week peanut feeding period 2 pigs were killed from each lot and all 4 were oily, both according to committee gradings and refractive indexes. After 33 days on corn with tankage following peanuts 2 more hogs were killed from each lot and 3 of the 4 were oily, the other 1 being soft. This experiment was interrupted by sickness among the hogs and, in fact, some of the hogs were lost. The experiment is being continued, however, and the additional results are yet to be obtained. They will have to be reported at the next meeting.

Feeding Results

The experiment was conducted at the U. S. Experiment Farm, Beltsville, Maryland, starting November 25, 1924, in which 25 fall 1924 farrowed pigs averaging 39.32 pounds each were placed on a ration of low grade shelled peanuts and mineral mixture self-fed. This test continued for eight weeks until January 20, 1925, with the feeding results as outlined in the following table.

No. pigs on test..... :	25
No. hog days on test..... :	1400
Total initial weight..... :	983
Average initial " ..... :	39.32
Total final " ..... :	1469
Average final " ..... :	58.75
Total gain ..... :	486
Average gain per pig..... :	19.44
Average daily gain ..... :	.347
Total feed consumed ..... :	2530
Peanuts ..... :	2120
Mineral Mixture ..... :	410
Total feed consumed per 100# gain	520.6
Peanuts " " " "	436.2
Mineral mix. " " "	84.4
Feed cost per paddock ..... :	118.30
Feed " " 100# gain ..... ;	24.34

Peanuts .05 per lb.
Min. mix. .03 " "

At the close of the eight week peanut period it was decided to carry these pigs another 4 weeks. During the eight weeks the pigs had gained very slowly as indicated by the average daily gain of .347 lb. per pig.

The pigs were then divided into two lots, one containing 12 pigs, the other lot 13 pigs. The lot of 12 pigs remained in Paddock O and received the same ration as in the previous period, namely peanuts and mineral mixture self-fed. The lot of 13 pigs were put on test in Paddock N and received a ration of peanuts, tankage and mineral mixture self-fed.

The following table shows feeding results of the second period of the test (January 20 to February 17, 1925).

	Pad. N.	Pad. O
No. hogs on test	13	12
No. hog days on test	364	336
Total initial weight	757	712
Average " "	58.23	59.22
Total final weight	1133	912
Average " "	87.15	76
Total gain	376	200
Average " per hog	28.92	16.6
" daily gain	1.033	.595
Total feed consumed	932	915
Peanuts	737	855
Tankage	155	
Mineral mixture	40	60
Feed consumption per 100# gain	247.87	457.50
Peanuts	196.01	427.50
Tankage	41.22	
Mineral mixture	10.64	30.00
Feed cost per paddock	42.70	44.55
Feed " " 100# gain	11.35	22.275

Peanuts	.05 per lb.
Tankage	.03 " "
Min. Mix.	.03 " "

The results as shown in the above table are very highly in favo of the peanut-tankage lot as indicated by the average daily gain of 1. pounds in Paddock N as against 0.595 pounds in Paddock O. Paddock N. required 247.87 pounds of feed per pound gain while the Paddock O pigs required 457.50 pounds of feed per pound gain.

Another interesting study for this period is shown in the follo ing table which shows the gains made by individual pigs. The comparis of rate of gain of litter mates in the two lots is interesting.

Paddock N. (Lot 1)						Paddock O (Lot 2)				
Hog No.	Weight 11/25/24	Weight 1/20/25	Gain 8 week period	Weight 2/17/25	Gain 4 week period	Hog No.	Weight 7/25/24	Weight 1/20/25	Gain 8 week period	Weigh 2/17/2
19.3	46	67	20	102	35	19.2	42	67	25	85
21.4	39	57	18	97	40	19.4	43	73	30	88
21.6	37	57	20	72	15	21.3	39	58	19	67
23.2	38	63	25	89	26	23.5	36	43	7	52
25.2	41	75	34	122	47	25.1	40	69	29	96
25.5	43	69	26	85	16	27.1	36	75	39	105
51.2	44	66	22	112	46	27.6	35	68	35	93
53.2	46	60	14	96	36	51.7	40	55	15	66
96.1	34	35	1	46	11	96.3	38	55	17	72
96.2	35	46	11	61	15	101.9	42	52	10	70
118.1	39	58	19	93	35	104.1	41	51	10	68
119.1	36	50	14	74	24	118.3	38	46	08	50
119.2	35	54	19	84	30					
Total	513	757	243	1133	376		470	712	244	912

Mr. Russell:

Are there any questions?

It is not quite 12:00 o'clock and I think we had better go along. We have one more peanut hardening test, that from Georgia. We will now hear the report from this station by Mr. Edwards.

Mr. Edwards:

For these experiments thirty pigs were purchased from Blake Brothers, Griffin, Georgia, October 16, 1924. These thirty pigs were of mixed breeding; showing a large amount of Duroc-Jersey blood, with several of the animals showing some Poland-China. The actual breeding of these pigs was unknown, but several are thought to be pure bred, and none of them were without improved blood. They were not as uniform a bunch as would be desirable for experimental purposes, but were the best obtainable because of the shortage of pigs in Georgia at the time they were purchased. Blake Brothers had bought these hogs from various points in Tennessee and Georgia from four to eight weeks before they were sold to the Experiment Station. Their previous feeding was unknown, but Mr. Otis Blake stated that he did not believe any of them had been fed on peanuts or other soft-pork-producing feeds before he purchased them. All seemed to be spring pigs of 1924. After coming into the hands of Blake Brothers they were fed on waste peppers and pepper parts from the Pimiento pepper canning factory in Griffin, Georgia, with small amounts of wheat shorts and shelled corn. After they were purchased by the Experiment Station, these pigs received a well-balanced ration of shelled corn, wheat middlings (shorts), and digester tankage until they were put on test with peanuts, self-fed.

Weights were taken on these thirty pigs at irregular times, but fairly uniform periods, beginning about the middle of November until the test actually started. The following averages were obtained on these pre-experimental weighings:

Date	Averages	Totals
Nov. 14, 1924	63.1 lbs.	1894.0 lbs.
Nov. 19, 1924	59.25 lbs.	1777.5 lbs.
Nov. 26, 1924	61.9 lbs.	1858.0 lbs.
Dec. 1, 1924	64.63 lbs.	1939.0 lbs.
Dec. 5, 1924	65.67 lbs.	1970.0 lbs.

At the time these pigs were purchased from Blake Brothers, two extra pigs were bought as checks for slaughter in order to see whether the thirty pigs were suitable for this experiment. These two pigs were killed locally or October 12, 1924. The carcass inspection was made by the Animal Husbandman of the Georgia Experiment Station, after the seventy-two hours chilling period, in the cooler of Cook's market, Griffin, Georgia, temperature 38 degrees Fahrenheit. Carcasses were graded as being soft and watery with a very thin covering of back fat and scanty leaf fat deposit. Carcass No. 1 might perhaps be classed as oily instead of soft.

The refractive indexes for the two carcasses were as follows:

	Outer Back Fat	Inner Back Fat	Leaf Fat
Carcass No. 1,	1.4609	1.4638	1.4596
Carcass No. 2,	1.4604	1.4599	1.4585

On December 19, 1924, the thirty pigs were ear-tagged and vaccinated by simultaneous method against hog cholera and treated against worms with capsules containing santonin, areca nut, etc. Dr. Coffman of the Georgia State Veterinary Office gave the serum and virus injections and the vermifuge. The pigs were fed lightly after treatment and seemed to suffer no ill effect.

During the pre-experimental period the pigs were kept in two lots and fed separately; the lighter being in one lot and the heavier in another, - each lot being fed so as to bring all pigs, as nearly as possible, to uniform weights.

Experimental Data:

At the beginning of the experiment, proper weights were taken on three successive days, at 8:30 A.M. each day. The rule in weighing throughout the experiment has been to make all weighings at 8:30 A.M. on weighing days. This makes for greater uniformity in weights, minimizing the influence of the "fill" factor. The three successive weighing days at the beginning of the experiment were January 1, 2, and 3. The experimental feeding began on the morning of January 2, immediately after the weighing was finished. Three check pigs were shipped on January 3, to the Beltsville Farm. These three pigs had not received any peanuts. The other twenty-seven pigs were put on a ration of peanuts (unshelled), self-fed, and were kept on this ration for eight weeks, in one lot together. The gains made during the eight weeks were not very large as compared to normal corn ration gains, but were probably not unusually low for a peanut ration. All three check pigs were graded soft by the grading committee in Beltsville.

Regular weighing days were every two weeks, following the start of the experiment, January 2.

The peanut feeding terminated on February 27. The remaining twenty-four pigs were divided into two lots, as uniformly as possible, with weight considered as the most important determining conditions, with sex and color receiving only minor attention. One of these lots, of twelve, was put on a ration of shelled corn, 60 per cent digester tankage, and mineral mixture; all free choice, self-fed. The other lot of twelve was put on a ration of brewer's rice, 60 per cent digester tankage, and mineral mixture, also free choice, self-fed.

The two lots were in adjoining, similar pens, each equipped with concrete feeding floor, cement water trough, self-feeders, of the standard type, the Iowa type portable hog houses and fences of woven wire; water

was allowed to each lot "ad lib". On April 20, five pigs were shipped to the Beltsville Farm for slaughter, grading and sampling. Three of these were chosen from the lot received shelled corn and two were chosen from the lot receiving brewer's rice. The reason only two pigs were taken from the brewer's rice lot was because on April 10 one pig from this lot died very suddenly and samples were taken from it for testing. The shipment of April 20 was made a few days before the regular shipping date in order that data on this killing might be available in time for the spring conference.

Accompanying this report are complete data on weights and feeding.

Feed Record for Pigs on Soft Pork Experiments,
Georgia Experiment Station,
1924-25

The feeding of peanuts started on the morning of January 2, 1925, after weighing was completed (weighing started at 8:30 A.M.) and continued for eight weeks, ending in the evening of February 26, 1925. Twenty-seven pigs were fed together in one pen during this eight weeks period (three of the original thirty pigs having been shipped to Beltsville, Md., to the Bureau of Animal Industry Farm for slaughter as "checks" on January 3, 1925; these three pigs did not receive any peanuts before shipping). The peanuts fed during this eight weeks period were purchased from Dr. G. R. Luke, Ashburn, Ga., for $95.00 per ton plus freight charge of $12.20 per ton to Griffin, Ga., plus bank exchange rate of 11-1/4 cents per ton plus hauling costs from Griffin to the Experiment Station. This makes a total cost per ton of $107.31-1/4 plus hauling costs estimated at about $1.25 per ton. The peanuts graded as No. 1 by the seller but were not equal to No.1 market grade peanuts, being somewhat discolored on the shells but quite good as regards the kernels. Samples were sent to O. G. Hankins, B.A.I., Washington, D.C., for grading and analysis and to F. H. Smith, Chem. Dept., Station for analysis. Peanuts were self-fed in the shells and all weights are for unshelled peanuts. The samples taken for grading and analyses were taken by mixing together all peanuts in lot and taking samples from various parts of the pile. A moisture check sack containing exactly 100 lbs. of peanuts was weighed at about 7 day intervals during the feeding period and showed the following changes in weight of peanuts (weight of sacks, double excluded):

Jan. 2, 1925	-- 100 lbs.	Feb. 5	-- 99 lbs.
" 13	-- 100 "	" 12	-- 99 lbs.
" 20	-- 100 "	" 20	-- 99.5 lbs.
" 29	-- 99 "	" 27	-- 99.0 "

The weights of the peanuts in shell fed to the 27 pigs during the 8 weeks period:

Jan. 2 --	55	lbs
3 --	100	"
4 --	130	"
5 --	155	"
9 --	100	"
11 --	50	"
12 --	50	"
13 --	100	"
14 --	100	"
15 --	100	"
16 --	100	"
17 --	50	"
18 --	100	"
19 --	100	"
20 --	150	"
21 --	150	"
22 --	100	"
24 --	50	"
25 --	100	"
26 --	50	"
27 --	100	"
28 --	100	"
29 --	150	"
30 --	100	"
31 --	150	"
Jan. Total	2490	lbs.

Feb. 1 --	100	lbs.
2 --	50	lbs.
3 --	50	"
4 --	150	"
5 --	150	"
6 --	100	"
7 --	100	"
8 --	100	"
9 --	150	"
10 --	100	"
11 --	150	"
12 --	100	"
13 --	150	"
15 --	100	"
16 --	150	"
17 --	150	"
18 --	100	"
19 --	150	"
20 --	100	"
21 --	150	"
22 --	150	"
24 --	150	"
25 --	150	"
26 --	60	"
Feb. Total	2860	lbs.
Grand Total both months	5350	lbs.

The 27 pigs that were fed on peanuts for 8 weeks (Jan 2, to Feb. 26, inclus., 1925) were taken off of the peanut ration on the evening of Feb. 26, and on the following morning, Feb. 27, immediately after weighing (Which started at 8:30 A.M.) they were divided into two uniform lots of 12 pigs each. The extra three pigs were shipped after selection, to the B. A. I. Farm at Beltsville, Md., for slaughter grading and sampling. The division of the 24 pigs into two uniform lots was made primarily with consideration to weight and condition, but sex and color were considered where possible. The division showed remarkable uniformity for the factor of weight and condition but it was not possible to get a very uniform division as regards sex and color. These two lots of pigs of 12 each were placed in separate, but adjoining, pens and self-fed free-choice on shelled corn, 60% digester tankage and mineral mixture for Pen No. 1 and brewer's rice, 60 digester tankage and mineral mixture for Pen No. 2. Feeding in both lots was done from large self-feeders (double-sided). The tankage was Swift's 60% digester tankage for both lots. The mineral mixture was made up according to the formula received from the B.AI., U.S.D.A., as follows:- 75# charcoal, 6# common salt, 3# flowers of sulphur, 6# Glauber's salts, 3# raw rock phosphate, 6# ground limestone, 1# pulverized copperas. This mineral mixture was given to both lots. The corn used was white shelled corn. Samples were taken for analysis. This corn was locally grown in central Georgia of the 1924 crop. Most of it was well matured. Most of this corn was purchased for from $1.10 to $1.25 per bushel. The brewer's rice was purchased from Geo. B. Matthews & Sons, New Orleans, La., for $65.75 per ton delivered in

Griffin, Ga. Samples were taken for analysis. Both lots of pigs had free access to concrete water troughs, with water from the regular source of supply of the Station. Below are given amounts of feed used by these two lots of pigs with dates:

	Pen No. 1			Pen No. 2		
Date	Shelled Corn	Tankage	Mineral	Brewer's Rice	Tankage	Mineral
Feb. 27	50 lbs.	*10 lbs.		100 lbs.	*10 lbs.	
28	-- "	48 "		--	52 "	
Mar. 1	50 "	--		--	--	
2	50 "	--		100 "	--	
3	50 "	--		-- "	--	
4	50 "	--		--	--	
5	25 "	--	27 lbs.	48 "	--	31 lbs.
6	50 "	--		50 "	--	
7	50 "	--		50 "	--	
8	50 "	--		50 "	--	
9	59 "	--		50 "	--	
10	70 "	25 lbs.		100 "	25 "	
11	65 "	-- "		50 "	-- "	
12	76 "	16 "		50 "	16 "	
13	80 "	-- "		50 "	-- "	
14	72 "	18 "		50 "	18 "	
15	72 "	-- "		50 "	-- "	
16	84 "	"		50 "	13 "	
17	72 "	--		50 "	-- "	
18	98 "	12 "		100 "	12 "	
19	90 "	--	14 "	100 "	--	14 "
20	72 "	18 "		50 "	18 "	
21	90 "	--		100 "	--	
22	72 "	20 "		100 "	--	
23	100 "	--		50 "	--	
24	90 "	12 "		50 "	12 "	
25	82 "	--		100 "	--	

*These figures for tankage on Feb. 27 (10 lbs. to each pen) are blood meal; tankage not available.

26	90 "	--		100 "	--	
27	100 "	20 lbs.		50 "	20 lbs.	
28	90 "	--		50 "	--	
29	97 "	--		50 "	--	
30	100 "	20 "		100 "	16 "	
31	100 "	--		100 "	--	
(Sub-total to date)	2346 lbs.	*232 lbs.	41 lbs.	1998 lbs.	*212 lbs.	45 lbs.

*Sub-total figures for tankage include 10 lbs. of blood meal for each pen.

	Pen No. 1			Pen No. 2		
Date	Shelled Corn	Tankage	Mineral Mixture	Brewer's Rice	Tankage	Mineral
April 1	100 lbs.	--lbs.		50 lbs.	-- lbs.	
2	100 "	20		50	20	
3	100 "	--		50	--	
4	100 "	--		100	--	
5	100 "	--		100	--	
6	100 "	20		100	20	
7	70	--		50	--	
8	80	--		50	--	
9	90	--		100	--	
10	90	20		100	20	
11	90	--		100	--	
12	90	--		50	--	
13	90	--		50	--	
14	90	20		100	20	
15	90	--		100	--	
16	90	--		50	--	
17	72	--		50	--	
18	72	10		50	--	
19	72	--		100	--	
20	90	16		100	--	
21	72	--		50	--	
22	72	--		50	--	
23	72	--		50	--	
24	80	20		50	--	
25	64	--		50	20	
26	50	--		50	--	
27	50	--		100	--	
28	50	--		100	--	
29	50	--	25 lbs.	50	--	25 lbs.
30	60	--		100	--	
(Sub-total to date)	4742 lbs.	358 lbs.	66 lbs.	4098 lbs.	312 lbs.	70 lbs.

SUMMARY OF WEIGHTS AND NOTES TAKEN ON PIGS IN SOFT PORK EXPERIMENTS 1924-25
GEORGIA EXPERIMENT STATION, EXPERIMENT, GA. (PEANUT FEEDING)
(Weights given in pounds and decimals with date at head of column)

Ear Tag	Sex	Color	--------Starting Weights--				----------Regular 14 day Weights----								
			1/1/25	1/2/25	1/3/25	Aver.	1/16/25	1/30/25	2/13/25	2/27/25	3/13/25	3/27/25	4/10/25	4/20/25	4/24/25
163	Male	Red	55.0	54.5	54.5	54.67	----	----	----	-----	----	----	----	----	----
170	Female	R"	64.5	63.0	63.5	63.67	----	----	----	-----	----	----	----	----	----
177	F"	R"	60.5	60.0	62.5	61.00	----	----	----	----	----	----	----	----	----
#Averages			60.0	59.2	60.2	59.78									
172	M	R-B	69.5	67.0	67.0	67.83	68.5	79.5	90.0	103.0	----	----	----	----	----
185	F	Black	44.0	42.5	43.0	43.17	45.5	56.0	65.5	72.5	----	----	----	----	----
187	M	R	50.0	48.0	49.0	49.00	49.0	51.5	53.0	55.0	----	----	----	----	----
##Averages			54.5	52.5	53.0	53.33	54.3	62.3	69.5	76.8					
165	F	B	64.5	64.5	64.0	64.33	73.5	82.5	90.5	97.5	131.5	151.5	180.0	197.0	207.5
167	F	B	55.5	53.0	54.0	54.17	58.0	72.0	83.5	92.5	130.0	154.5	187.5	204.5	211.5
171	M	R	61.5	60.5	60.0	60.67	66.0	81.5	94.0	106.0	145.0	176.5	206.5	225.5	235.5
173	F	R	73.0	71.0	72.5	72.17	81.5	99.5	118.0	135.5	170.0	189.5	209.0	209.0	220.5
174	M	R	62.5	60.5	61.0	61.33	71.5	86.0	101.5	112.0	154.0	187.0	216.5	237.5	X----
175	M	R	60.0	58.0	58.0	58.67	69.0	83.0	96.0	110.0	146.5	173.5	198.5	219.5	228.5
175	M	R	62.5	61.0	61.5	61.67	68.0	76.5	86.0	97.0	133.0	163.5	189.0	212.5	X----
178	M	R	45.0	44.0	45.5	44.83	50.5	65.0	80.0	88.5	119.5	142.0	166.5	182.0	189.0
180	M	R	62.0	60.0	61.5	61.17	71.5	89.5	105.0	116.0	148.5	180.0	208.5	224.0	233.5
182	M	R	62.0	59.5	62.0	61.17	71.0	82.5	97.5	107.5	145.5	176.0	204.5	222.5	231.5
186	F	B	47.0	44.5	45.0	45.50	48.0	62.5	76.5	87.5	113.0	139.5	167.5	181.5	X----
188	M	R	58.0	56.5	57.0	57.17	63.5	71.0	74.0	81.0	115.0	138.5	167.0	182.5	188.5
###Averages			59.5	57.8	58.5	58.57	66.0	79.3	91.9	102.6	137.6	164.33	191.75	208.17	162.17
159	M	R	62.0	60.0	62.0	61.33	68.0	81.0	95.0	108.5	141.5	179.0	216.5	230.5	239.5
160	F	B	58.5	57.0	57.0	57.50	70.5	84.0	96.5	106.0	138.0	166.5	191.5	211.5	212.5
161	M	R	65.0	64.0	65.0	64.67	70.5	81.5	93.5	106.0	139.0	166.5	189.0	204.0	X----
162	F	R	59.0	58.0	57.5	58.17	65.5	77.5	86.5	97.0	106.5	115.5	149.5	164.5	173.0
164	F	R	70.0	68.0	70.5	69.50	85.0	101.0	115.0	124.0	141.5	166.5	200.0	224.5	230.5
166	M	R	58.0	57.5	56.0	57.17	65.0	75.5	81.5	83.0	105.0	127.0	161.0	183.0	188.0
168	F	R	66.0	64.5	64.5	65.00	77.0	92.0	101.0	107.5	116.0	139.0	165.0	- D -	-----
169	F	R	62.0	62.5	60.5	62.00	69.0	82.5	97.0	110.5	123.5	144.5	171.0	189.0	196.5
179	M	R	55.5	54.0	54.0	54.50	59.5	72.0	83.0	92.0	122.0	148.5	166.5	180.5	189.0
181	F	R	63.5	62.0	62.0	62.50	71.0	82.0	89.5	94.5	105.0	120.5	147.5	163.0	168.0
183	M	R	61.0	59.0	60.0	60.00	70.0	82.0	100.5	115.0	157.0	196.5	230.5	255.0	258.0
184	F	R	55.5	52.5	53.5	53.83	59.0	71.3	81.0	88.0	105.5	131.0	149.5	164.5	X----
####Averages			61.4	59.9	60.2	60.51	69.2	81.9	93.3	102.7	125.0	150.0	178.13	180.83	154.58

These 3 pigs (163, 170 and 177) shipped to Beltsville, Md., for slaughter on Jan. 3, 1925, as "checks".

These 3 pigs (172, 185 and 187) shipped to Beltsville, Md., for slaughter on Feb. 27, 1925, at close of peanut feeding.

These 12 pigs (165, 167, 171, 173, 174, 175, 176, 178, 180, 182, 186, and 188) were put in separate pen on Feb. 27, 1925, and composed the "corn hardened" lot.

These 12 pigs (159, 160, 161, 162, 164, 166, 168, 169, 179, 181, 183, and 184) were put in separate pen on Feb. 27, 1925, and composed the "rice hardened" lot.

Averages of all animals weighed on following days were:

1/1/25	1/2/25	1/3/25	Aver.	1/16/25	1/30/25	2/13/25	2/27/25
59.80#	58.23#	58.80#	58.94#	66.11#	78.56#	90.04#	99.76#

D This pig (168) died suddenly during the night of April 10, 1925; samples were taken from the carcass.

X These 5 pigs (174, 176, 186, 161, and 184) shipped to Beltsville, Md., for slaughter on April 20, 1925. This shipment was made 4 days before regular time for shipment due to the forthcoming conference of soft pork investigators.

Mr. Russell:

Mr. Hankins will now summarize these experiments.

Mr. Hankins:

I think I can do that very quickly. In summarizing and putting together results from the various experiments, you men are familiar with the fact that we have to use more or less arbitrary figures for our divisions, taking pigs of certain weight limits and certain gain limits and grouping the data from these animals to get averages for plotting the curves.

In peanut feeding, as we all know, much of the work has been done with pigs starting at about 100 pounds initial weight, to be exact, from 83 to 114 pounds. The experiment Mr. Edwards reported was with lighter weight pigs. We have made a summary of experiments of this kind with the pigs having initial weights of from 50 to 84 pounds. I am going to give you a summary on such pigs fed peanuts followed by corn and tankage. We have data on 34 such pigs. The average initial weight is about 70 pounds, the range being from 50 to 84. They have been sub-divided according to gain made on peanuts into three groups. (Chart I) the averages being

(1) 37 pounds gain on peanuts, 83 pounds subsequent gain on corn with tankage required to attain 1.4601.5
(2) 62 pounds gain on peanuts, 106 pounds subsequent gain on corn with tankage required to attain 1.4601.5
(3) 80 pounds gain on peanuts, 114 pounds subsequent gain on corn with tankage required to attain 1.4601.5

They required the respective gains on corn indicated to bring them down to the medium hard line or in other words, the line between medium soft and medium hard, which, of course, is 1.4601.5. A gain ratio, according to these figures. of 1:2.2 was required to bring these 70 pound peanut-fed hogs to that line after having made 37 pounds gain on peanuts. The ratio for the group was 1:1.7. The third group made a gain of 80 pounds on peanuts and 114 pounds gain on corn and tankage was required to bring them down to the same line. That is a gain ratio of 1:1.4. There are not enough hogs represented in this to be absolutely conclusive.

Mr. Russell:

We will now adjourn for lunch. After lunch probably the first thing that will be taken up will be a report of some work that has been carried on this year at Beltsville starting with 100 pound pigs carried 8 weeks on peanuts and as much as 24 weeks on corn and tankage. The last killing contained 10 hogs and I think Mr. Hankins will give you some very interesting results, and incidentally I might say that we are hoping, as always, that some real interesting facts that are practical to the farmer and that he wants to know may issue from this meeting and on this particular phase of the work.

For the benefit of those who have not heretofore attended our meetings I will state that it has been our practice to appoint a committee of five to make a careful study of the results of experiments we have carried on and to make recommendations for the coming years' work based on what has been done also to report to this meeting any conclusions they think have been reached as the result of the work up to date. I will now appoint the committee to act during this meeting.

Department	Stations
Mr. Hankins	Mr. Templeton
Mr. Ellis	Mr. Vestal
	Dr. Jacob

Tuesday Afternoon

Mr. Russell:

We will now start the afternoon program. We announced before lunch the next subject to take up would be some hardening work that had been done at Beltsville on 100 pound pigs. Mr. Hankins will now report the results of this work.

Mr. Hankins:

Up to the present year we have done considerable work with 100 pound pigs on peanuts. During the year just closed, however, the station at Beltsville was the only one that was in position to go ahead in that line of work. We thought we had just about gotten to the point where we could feel sure that feeding under these conditions (8 weeks on peanuts starting with pigs at 100 pounds) firm hogs could not be produced on corn with tankage within a practical period and further work along that line would be for the purpose of determining for scientific reasons just how much time and how much gain were necessary to produce firm hogs. At Beltsville we conducted one experiment recently completed along that line. We used 33 pigs, three were killed as checks and 30 placed on these low-grade shelled peanuts with mineral mixture self fed in dry lot. This experiment was started last September. The average initial weight of these hogs was not as close to the specified weight as we would have liked. It was 116.16 pounds. The average final weight off peanuts after 56 days feeding was 164.13 pounds. The average daily gain during that time was .86 pounds. As in the case of the experiment discussed this morning it is not a very satisfactory figure. Mr. Hostetler did better than that with pigs considerably smaller. Nevertheless that is what we got. These pigs were placed on shelled corn, tankage and minerals in dry lot and fed for 24 weeks following the peanut feeding. We made killings after 16, 20 and 24 weeks. Experience had shown that it was not necessary to kill before 16 weeks of hardening had occurred. There were three killings and in the first we killed 10 hogs, the average initial weight was 118 pounds, 48 pounds gain made on peanuts and 148 on corn and tankage. This is a

gain ratio of 1:3.1. The average refractive index was 1.4603. These were in the medium soft class after 16 weeks on corn and tankage feeding.

Four weeks later we killed again, 9 hogs this time. The average initial weight was 118 pounds, 47 pounds gain made on peanuts and 188 pounds on corn and tankage, or a gain ratio of 1:4. That time we had an average refractive index back fat of 1.4598. On the basis of refractive index that does not look so bad. It would class them as medium hard as an average. As a matter of fact there was not a single carcass graded medium hard or hard by the committee. They were all soft or medium soft.

The last killing of 10 hogs again had an average initial weight of 113 pounds, made 50 pounds gain on peanuts and 228 pounds on corn. This was a gain ratio of 1:4.6. The refractive index was 1.4599. In this killing we had 2 medium hard hogs with all the others softer than that. That is, 2 out of 10 were medium hard and the remainder medium soft and soft.

In the first killing there was 1 medium hard hog which gained only 27 pounds on peanuts and 151 pounds on corn with tankage. The refractive index on that hog was 1.4600. The rest of the 10 were soft and medium soft. Out of the 29 hogs in this experiment there were 3 medium hard and none hard. All the rest were medium soft or soft. I might say that the average final weight of the 10 hogs in the last killing was 391 pounds. The results of this experiment are in line with previous results. In a few cases we have obtained a little higher percentages of hard hogs but they could be explained in every case or nearly every case.

The feeding results from this experiment follow:

The experiment was conducted on feeding peanuts to hogs at the U. S. Experiment Farm, Beltsville, Maryland, from September 10 to November 5, 1924. Thirty hogs of spring 1924 farrow of Chester White, Duroc Jersey, Hampshire, Poland China, Tamworth and Mixed Breeding were used in the test.

The peanuts used were of low grade variety, and were purchased from the Planters Nut and Chocolate Company, Suffolk, Virginia. The peanuts were fed free choice in addition to mineral mixture which was also self fed.

On November 5, 1924, the hogs were taken off peanuts and started on the hardening period, being self fed shelled corn, 60 per cent tankage and mineral mixture.

The following table shows the individual weights of hogs at the beginning and end of the test and gain made on peanuts.

Hog No.	Wt. Nov. 5.	Wt. Sept. 10.	Gain	Gain during finishing period
19.1	198	136	62	160
19.2	157	114	43	202
19.3	201	142	59	189
19.6	192	131	61	154
19.7	139	112	27	151
20.7	155	105	50	186
22.3	198	135	63	188
22.4	160	114	46	210
41.1	159	112	47	50
41.2	180	116	64	137
73.4	130	102	28	161
73.5	157	115	42	171
73.7	157	104	53	148
73.10	137	104	33	169
73.11	154	102	52	213
74.8	142	115	27	187
91.1	170	112	58	206
88.4	149	118	31	154
88.6	166	118	48	208
101.1	195	136	59	146
101.2	170	120	50	151
101.6	185	133	52	163
103.1	163	109	54	292
103.6	152	105	47	263
104.4	169	111	58	224
105.7	194	131	63	273
106.2	144	107	37	131
107.5	152	104	48	245
121.3	142	100	42	144
125.1	157	122	35	228
Total	4924	3485	1439	5504

The following table shows feeding results of the peanut feeding period, September 10 to November 5, 1924.

No. hogs on test	30
No. hog days on test	1680
Total initial weight	3485
Average initial weight	116.16
Total final weight	4924
Average final weight per hog	164.13
Total gain	1439
Average gain per hog	47.96
Average daily gain per hog	.8565
Feed consumed	4630
Peanuts	4475
Mineral mixture	155
Peanuts consumed per day per pig	2.66
Peanuts consumed per pound gain	3.11
Mineral mixture consumed per pound gain.	.107
Feed consumed per pound gain	3.217
Feed cost per paddock	226.16
Feed cost per 100 pounds gain	15.716

Cost of feed:
Peanuts $99.00 per ton (freight included) 0.495 per lb.
Mineral mixture .03¢ per lb.

Following 56 days on peanut feeding, 30 spring 1924 pigs were started on the finishing period during which time they received shelled corn, tankage, and mineral mixture from self feeders.

A killing of 10 hogs was made after 16 weeks on finishing feeds to determine the degree of firmness of carcass. A second killing of 9 hogs was made March 30 after 30 weeks on corn and tankage. The final killing of 10 hogs was made on April 22 after 24 weeks on corn and tankage following 8 weeks peanut feeding.

The following table shows feeding results of 30 hogs during the hardening period on corn and tankage following 56 days on peanuts.

No. hogs on test.....	30
No. hog days on test.....	4043
Total initial weight	4924
Average initial weight	164.133
Total final weight	10,428
Average final weight	347.6
Total gain	5504
Average gain per hog	183.466
Average daily gain per hog	1.361
Feed consumed	26,590
Corn	25,155
Tankage.....	1,100
Mineral mixture	335
Feed consumed per 100 pounds gain...	483.1
Corn	457.0
Tankage.....	19.9
Mineral mixture.....	6.1
Feed cost per paddock.....	694.32
Feed cost per 100 pounds gain.....	12.61

Feed cost based on following prices:

Corn	$1.45	per bushel
Tankage	3.00	" cwt.
Mineral mix.	3.00	" "

Mr. Russell:

Mr. Hankins, will you tell us how many hogs altogether have been carried through the 24 week period.

Mr. Hankins:

There have been three experiments about 20 hogs.

What I was going to say is that where we got hard or medium hard hogs with this feeding the hogs made a comparatively small gain on peanuts. Those of you who received copies of the bulletin manuscript got a copy of this chart (Chart II). It was prepared before the results from this experiment were obtained. We have given much study to all of the data and find that the results obtained in this last experiment do not modify this chart to any appreciable extent. You recall that this chart was used in the bulletin for the purpose of showing that corn and tankage fed subsequent to peanuts made the hogs harder. We did not say how hard. We feel that we have arrived at a point now where we can say something more definite.

Mr. Russell:

Are there any questions?

Mr. Salmon:

Are the initial weights about the same in the three groups shown in the chart?

Mr. Hankins:

The initial weights are about the same. On no occasion does the range go beyond 85 to 114 pounds inclusive.

Mr. Salmon:

I just wondered if the initial weight were included in your corn gain would it make the ratio more uniform.

Mr. Russell:

We shall have the report of the work done in the Wilson & Company packing plant at Oklahoma City. I think that probably you will get some interesting data from this report. We want to bear in mind that just in so far as it is possible for us to do so we must give out something that is practical to the hog grower. The farmer is interested in what he can do in his own hog lot.

There are some in the meeting who have not been here before and for their benefit I will say that we have a report of the fourth year's work from Mr. Greene who was unable to be present at this meeting. I will ask Mr. Hankins to read this report.

Mr. Hankins:

COASTAL PLAIN EXPERIMENT STATION
MCNEILL, MISS.

Soft Pork Exp. 1924

At the Coastal Plain Experiment Station, McNeill, Miss., three lots of 25 head of hogs each were fed for a period of 56 days on peanuts grazed, peanuts self-fed and corn and tankage self-fed. They started at a weight of approximately 100 pounds per head and gained approximately 80 pounds per head. They were shipped to Oklahoma City, Okla., for slaughter, determination of the carcass grading and shrink through the curing process.

Conditions of the Experiment

The pigs going on test were carefully selected from a bunch of 183 head of spring farrowed pigs part of which were raised at McNeill and a part at Beltsville, Md. The Beltsville pigs arrived at McNeill 24 days before the experiment started. Both the Beltsville and McNeill pigs had been given the serum and virus immunization treatment before weaning and on arrival of the Beltsville pigs at McNeill both bunches of pigs were penned in close lots and inoculated with hog cholera virus being held in close

lots for 24 days during which time three temperature readings were taken. Most of the pigs showed a reaction to the virus inoculation and many showed respiratory trouble in the nature of the "Flu", aggravated by the extreme dustiness of the lots which had no rain on them from July 11 until the termination of the feeding test. On Oct. 15 the pigs were dipped in Cresol and divided into the different lots choosing pigs as near 100 pounds in weight as possible, which had not shown an abnormal temperature on Oct. 13. One pig in the corn and tankage lot died 26 days after the experiment started, with evidence of pneumonia.

The handling of the pigs before starting the experiment was unusual in a feeding test and no doubt influenced the gains to some extent although the gains made were economical in the amounts of feed consumed.

Lot 1 Peanuts Grazed:

This lot of 25 head grazed 20 acres of peanuts for a period of 28 days only, at which time the peanuts were exhausted and the gains at the end of this period indicated that the pigs during the last of the period were not getting a full ration. The pigs were held on the field where they could graze the peanut vines at will and were self-fed shelled peanuts and peanuts in the hull until the end of the test. This lot as well as the other lots had a mineral mixture self-fed. This 20 acre field of peanuts produced 574 pounds of pork. During the same time the corn lot made a gain of 945 pounds requiring 60 bushels of corn which could have been made on the 20 acres of land at the rate of 3 bushels per acre. Although peanuts suffered from drouth there was a good stand fairly well fruited but very poorly filled. The amount of pork produced per acre of peanuts was in line with previous results at this station and indicated definitely that peanuts are not an economical crop for hog grazing on the stiffer clay subsoil lands that will produce as much as 20 bushels of corn per acre.

Lot 2 Peanuts Self-Fed

This lot was self-fed peanuts in the dry lot. The peanuts were shelled and broken being graded out in the manufacture of candy. They were bright and of good quality. Fed in this form 1 pound of peanuts had a feeding value of approximately 1 1/3 pounds of corn.

Lot 3 Corn and Tankage Self-Fed

This lot was fed corn and tankage in the dry lot with free access to a mineral mixture of equal parts of salt, acid phosphate and bone meal. The chief point of interest in the feed record of this lot is the amount of mineral consumed which was 95 pounds as compared with 48 pounds in the Peanut Grazed Lot and 57 pounds in the Peanut Self-fed Lot, all lots receiving the same mixture. The reason for this high consumption of mineral in the corn and tankage lot is not apparent as they also consumed 49.7 pounds of marine tankage per 100 pounds gain, this form of tankage being high in mineral content. The corn fed was No. 2 mixed. In the previous year's test of which this was a duplicate the Peanut grazed lot consumed

30# of mineral, the Peanut Self-fed Lot consumed 41# and the corn lot but 8 pounds of mineral.

Slaughter Data

Weights on hams and bacon through cure and smoke show that the shrinkage of the hams was quite uniform for both the corn and peanut lots, being slightly above 2 per cent for each lot. However, the bacon from the corn fed lot showed a gain of 1.01 per cent through cure and smoke while the peanut grazed lot showed a loss of 4.79 per cent and the peanut self-fed lot showed a loss of 4.17 per cent.

COASTAL PLAIN EXPERIMENT STATION
McNEILL, MISS.

SOFT PORK EXPERIMENTS 1924

	Lot 1	Lot 2	Lot 3
Number of Hogs	25	25	25
Average initial weight	100.8#	101.6#	102.7#
Average final weight	171.3#	177.4#	186.8#
Average total gain (56 days)	70.5#	75.8#	83.7#
Average daily gain per head	1.26#	1.35#	1.49#

Feed per head daily

Peanuts grazed . . . . Lot 1	5.62# in Hull	
Peanuts self-fed . . . Lot 1	4.51# Shelled	
Peanuts self-fed . . . Lot 2		3.5#
Corn . . . . . Lot 3		5.3#
Tankage. . . . . Lot 3		74#

Minerals Consumed

48#	57#	95#

Feed Consumed per 100 pounds gain

Peanuts grazed . . . . Lot 1		
Peanuts self-fed . . . Lot 1	275.0#	
Peanuts self-fed . . . Lot 2		258.2#
Corn & Tankage self-fed Lot 3		
Corn		354.0#
Tankage.		49.7#

Feed cost per 100 pounds gain

Lot 1	
Lot 2	
Lot 3	$10.77

(Corn $1.45 per bu. - Tankage $65.00 per ton)

Meat Curing Data

Cured at Oklahoma City, Okla.

Gain or Loss Through Cure and Smoke

	Lot 1 Peanuts Grazed	Lot 2 P.Self-fed	Lot 3 Corn & Tankage
	Hams	Hams	Hams
Number of hogs to lot	25	24	24
Green weight	584-12	589-14	626-2
Cured weight	628-6	629-4	669-8
Smoked weight	572	577-10	612-12
Gain green wgt. through cure	7.35%	6.79%	7.03%
Loss cured wgt. through smoke	8.92%	8.11%	8.51%
Gain or loss green wgt. through cure and smoke	-2.22%	-2.03%	-2.08%
	Bacon	Bacon	Bacon
Green weight	407-10	375-10	454-12
Cured weight	458-10	417-6	454-12
Smoked weight	391	357-14	459-2
Gain-green wgt. through cure	12.50%	10.90%	18.89%
Loss-cured wgt. through smoke	14.81%	14.15%	15.31%
Gain or loss-green wgt. through cure and smoke	-4.17%	-4.79%	1.01%

Mr. Russell:

Soon after we began our soft pork investigations, the question was raised as to the relative gain, dressing per cent and softness of pork produced by feeding peanuts in dry lot and peanuts grazed in the field. Involved in this was the gain or loss of the cured meats in the cures and smoking or the difference in gain or loss of these meats from the green weight through the smoke. The check was hogs fed corn and tankage in dry lot. It was also deemed advisable to do some slaughter work in some commercial packing plant to determine the difference, if any, in the results obtained under their conditions and our own at our abattoir at Beltsville. The plan was discussed with Mr. Wilson, president of Wilson & Company, and at that time president of the Institute of American Meat Packers, and it was arranged to do the slaughtering at Wilson & Company's plant at Oklahoma City.

The hogs used in these tests were practically all raised at Beltsville and shipped south at approximately 100 pounds weight for finishing. The tests were of 56 days duration.

The first year 60 hogs were fed at the Oklahoma Station at Stillwater, 30 had corn and tankage in dry lot and 30 peanuts self fed in dry lot. Sixty more were fed at the Texas Station at College Station, 30 had corn and tankage in dry lot and 30 were grazed on peanuts in the field.

The second year 90 head were fed at Texas, 30 had corn and tankage in dry lot, 30 peanuts self fed in dry lot and 30 were grazed on peanuts in the field.

The third year 90 head were fed at the Coastal Plain Experiment Station at McNeill, Mississippi, the same plan was followed as during the previous year at Texas, except that the peanuts in the field did not hold out and some dry nuts were fed by scattering in the field.

The fourth year (1924) 75 head were fed at McNeill in the same way as the previous year except that the grazed nuts did not last as long as they did in 1923 due to drouth conditions.

The following tables show the results of the four years' work, in comparing dressing per cent, average daily gain and gain or loss of the cured meats through the curing and smoking process, by feeds fed to the hogs.

It may be stated that with but two exceptions all the hogs that were fed corn and tankage graded hard while all the hogs fed peanuts either dry lot or grazed, graded either soft or oily. There was very little difference in the number grading soft as compared to those grading oily in the peanut dry lot or the peanut grazed hogs in 1922 and 1923, but in 1924 quite a large per cent of them graded oily. The hogs in 1924 were not physically graded, and grades reported were from chemical analyses.

Mr. Hankins:

Just another word relative to Mr. Greene's test. The average refractive indexes of the three lots were as follows:

Peanuts grazed	1.4622
" self-fed	1.4623
Corn and tankage	1.4597

There were 25 hogs to the lot.

Soybeans

Mr. Russell:

We will now take up the soybean work. The first station to report on this work is Mississippi. We will hear from Mr. Templeton.

Mr. Templeton:

The Mammoth Yellow soybeans were used in this experiment. The beans were grown together with corn in rows three and a half feet apart. The corn was gathered just previous to starting the experiment. The crop was planted the first of May and there was no rain of any consequence on the Experiment Station farm from the latter part of May until the early part of November; consequently, the corn and bean crop was very short.

The ground was very dusty during the early part of the grazing period and the beans shattered a few days after the hogs were turned on the bean field and they were forced to root the beans out of the dust.

The average daily gain for the hogs on the bean field, without supplement, was only .85 pounds per day. In previous experiments when the beans have made a good yield and the hogs had little difficulty in gathering them, average daily gains of around 1.13 pounds have been made.

The twenty-seven head of hogs used in this experiment were raised on the Experiment Station farm. They were pure-bred Duroc Jerseys, Poland Chinas, Hampshires, and a few cross-bred Duroc Hampshires. The hogs were thrifty and well developed at the time the experiment was started. The average weight was 119 pounds.

The following tables will give the results of the grazing period and the three four-week finishing periods in dry lot on corn and tankage, free choice in self feeder:

Soybeans Grazed - October 6 to November 17 (42 Days)

	Lot I - Soybeans Grazed	Lot II - Soybeans Grazed plus 2-1/2% Corn
Number of Hogs	12.	12.
Average Initial Weight (lbs.)	119.	120.
Average Final Weight (lbs.)	155.	184.
Average Daily Gain (lbs.)	.857	1.529
Feed per 100 Pounds of Gain	-	Corn 250.

First Dry Lot Finishing Period - 28 Days

Tankage Free Choice, Self Feeder - November 17 to December 15

	Lot I - Soybeans Grazed	Lot II - Soybeans Grazed plus 2-1/2% Corn.
Number of Hogs	12.	12.
Average Initial Weight (lbs.)	155.	184.
Average Final Weight (lbs.)	222.5	241.5
Average Daily Gain (lbs.)	2.35	2.05
Feed per 100 Pounds of Gain	Corn 370.3 Tankage 13.7 Total 384.0	Corn 404.6 Tankage 20.9 Total 425.5

Second Dry Lot Finishing Period - 28 Days

Corn and Tankage Free Choice, Self-feeder - December 15 to January 12

	Lot I - Soybeans Grazed		Lot II - Soybeans Grazed plus 2-1/2% Corn	
Number of Hogs	8.		8.	
Average Initial Weight (lbs.)	219.		239.	
Average Final Weight (lbs.)	269.		284.	
Average Daily Gain (lbs.)	1.80		1.60	
Feed per 100 Pounds of Gain	Corn	489.8	Corn	520.2
	Tankage	3.0	Tankage	4.2
	Total	492.8	Total	524.4

Third Dry Lot Finishing Period - 28 Days

Corn and Tankage Free Choice, Self-feeder - January 12 to February 9

	Lot I - Soybeans Grazed		Lot II - Soybeans Grazed plus 2-1/2% Corn	
Number of Hogs	4.		4.	
Average Initial Weight (lbs.)	269.		291.	
Average Final Weight (lbs.)	309.		328.	
Average Daily Gain (lbs.)	1.41		1.32	
Feed per 100 Pounds Gain	Corn	571.5	Corn	550.
	Tankage	3.4	Tankage	4.5
	Total	574.9	Total	554.5

The following table will give the results of the grading of the chilled carcasses:

Grading of Chilled Carcasses

Check Pigs	Live Weight	Corn Grade	Refractive Index
	125	S.	M. H.
	119	S.	S.
	127	M.S.	M. S.

Lot I - Soybeans Grazed

Time of Slaughter	Initial Weight	Pasture Gains	Dry Lot Gains	Ratio Gains	Com. Grade	Refractive Index
6 weeks grazing	122	36	62	1:1.72	M. H.	M. S.
soybeans	135	37	60	1:1.62	M. S.	M. S.
4 weeks dry lot on	110	42	66	1:1.57	M. S.	S.
corn and tankage	113	45	76	1:1.68	M. S.	S.
Average	120	40	66	1:1.64		
6 weeks grazing	141	31	162	1:5.22	M. H.	M. H.
soybeans	120	34	136	1:4.00	M. H.	M. H.
8 weeks dry lot on	103	31	116	1:3.74	M. H.	M. H.
corn and tankage	131	27	78	1:2.88	H.	M. H.
Average	124	31	123	1:3.96		
6 weeks grazing	113	25	122	1:4.88	M. S.	M. H.
soybeans	125	43	144	1:3.34	M. S.	M. H.
12 weeks dry lot on	91	43	186	1:4.32	M. S.	M. H.
corn and tankage	130	38	176	1:4.63	M. S.	M. H.
Average	115	37	157	1:4.29		

Lot II - Soybeans Grazed plus 2-1/2% Corn

6 weeks grazing	145	67	66	1: .98	M. H.	H.
soybeans	130	62	62	1:1.00	M. H.	M. H.
4 weeks dry lot on	115	67	56	1: .83	M. H.	M. H.
corn and tankage	87	61	66	1:1.08	M. H.	M. H.
Average	119	64	63	1: .97		
6 weeks grazing	124	66	126	1:1.90	H.	M. H.
soybeans	119	61	100	1:1.63	H.	M. H.
8 weeks dry lot on	127	67	110	1:1.64	M. H.	M. H.
corn and tankage	95	63	82	1:1.30	H.	M. H.
Average	114	64	105	1:1.61		
6 weeks grazing	119	63	128	1:2.03	H.	M. H.
soybeans	119	67	144	1:2.14	M. H.	M. H.
12 weeks dry lot on	133	61	128	1:2.09	M. H.	M. H.
corn and tankage	122	66	162	1:2.45	M. H.	M. H.
Average	133	64	141	1:2.17		

Finishing periods from four to twelve weeks in dry lot on corn and tankage self-fed, following a soybean grazing period of six weeks, with a subsequent gain of 1 : 1.64 to 1 : 4.29, produce carcasses that grade from soft to medium hard.

When soybeans are grazed, supplemented by a two and one-half per cent corn ration for six weeks, and the hogs are given a dry lot finishing period on corn and tankage self-fed for periods of four, eight, and twelve weeks with a subsequent gain of 1 :2.17, the carcasses of these hogs border between a medium hard and hard.

Mr. Russell:

Are there any questions?

The next on the program is a report of the same work from Pennsylvania. We have a report of the work at Pennsylvania from Mr. Grimes, who conducted the experiment at that station and who could not be with us. I will ask Mr. Hankins to read the report from Pennsylvania.

Mr. Hankins:

The Pennsylvania Station carried on an experiment similar to the one Mr. Templeton has just reported except that there were 4 lots instead of 2. In the lots on soybeans without corn supplement Pennsylvania had soybeans alone and soybeans with mineral mixture self-fed. The other pair of lots had soybeans grazed with 2-1/2 per cent of shelled corn with and without mineral mixture self-fed. I might say that this experiment at the Pennsylvania Station is an exact duplicate of the one conducted at Beltsville so far as plan of feeding is concerned. In both corn and tankage were self-fed free choice for a 12 week hardening period.

SOFT PORK INVESTIGATION

Soy Beans

Pennsylvania Experiment Station

The phase of the soft pork investigation assigned to the Pennsylvania Experiment Station during the season of 1924 had the following objects in view:

1. To determine the value of soy beans (grazed) for producing gain.

2. To determine the value of adding a mineral mixture to the soy bean ration.

3. To determine the value of adding a limited amount of shelled corn to the ration during the grazing period.

4. To determine the possibility of producing firm carcasses by feeding corn and tankage following the grazing period.

To study this problem four groups of ten pigs each were placed on feed October 2, 1924. Each group was selected with care as regards weight, type, breed, sex, and general condition. These pigs had been grazing on rape pasture and had received concentrate feed, a slop made up of corn meal, middlings, tankage, and salt.

Table I

Lot	No. of Pigs	Feed	Av. Initial Weight	Av. wt. end of 8 wk. grazing period	Av. gain	Gain per day
1	10	Soy beans	108.66 lb.	112.2 lb.	3.6 lb.	.064 lb.
2	10	Soy beans & mineral	111.50 "	109.6 "	-1.9 "	.033 lb.
3	10	Soy beans & 2-1/2 sh.corn	109.40 "	133.8 "	24.4 "	.435 "
4	10	Soy beans & corn & mineral	107.70 "	146.6 "	38.9 "	.693 "

The figures exhibited in the foregoing table indicate an unsatisfactory rate of gain during the grazing period. The two lots receiving corn naturally made more gain than the two lots confined to soy beans alone. The stand of soy beans was good, although the grain was not as good as is desired due to an unsatisfactory growing season for this crop. The beans were in the dough stage when grazing began.

Following the grazing period all groups were placed in dry lot where shelled corn, 60% protein tankage, and mineral mixture were available in self feeders. The feeding period continued here for four, eight, and twelve weeks, i.e., these pigs were removed from each group at the termination of the above mentioned periods.

Mineral mixture used:

Charcoal ----------	75 pounds
Raw rock phosphate----	3 pounds
Common salt ----------	6 "
Ground lime stone ----	6 "
Flowers of sulphur ---	3 "
Copperas ----------	1 "
Glaubers salts -------	6 "

Lot	No. Pig	Breed	Sex	Initial wt.	Wt. end of feeding prd.	Dressing % warm	Dressing % cold	Gain	Days on feed	Daily Gain	Grade
I	467	C.W.	Sow	148.0#	214#	80.89%	78.79%	66.0#	84	.78#	m. s.
I	475	Hamp.	Bar.	136.0	144	80.00	77.24	8.0	84	.09	s.
I	480	Berk.	Bar.	116.0	166	79.61	76.97	50.0	84	.59	m. s.
I	466	C.W.	Sow	148.0	206	80.21	79.19	58.0	112	.51	m. s.
I	493	H-B	Bar.	94.0	170	88.31	86.36	76.0	112	.67	m. h.
I	495	C.W.	Sow	82.0	188	82.46	80.12	106.0	112	.94	h.
I	486	Berk.	Sow	106.0	234	83.72	81.86	128.0	140	.91	m. h.
I	499	H-B	Sow	68.0	232	83.49	81.65	164.0	140	1.16	m. h.
I											
I											
II	465	D.J.	Bar.	144.0	210	83.59	81.03	66.0	84	.78	m. s.
II	472	C.W.	Sow	148.0	202	82.22	80.56	54.0	84	.64	m. h.
II	490	Hamp.	Bar.	102.0	178	82.14	80.36	76.0	84	.89	m. s.
II	464	"	"	120.0	234	83.19	81.42	114.0	112	1.01	m. h.
II	468	P. C.	"	124.0	250	84.81	82.70	126.0	112	1.12	m. h.
II	484	C. W.	Sow	104.0	210	82.83	81.31	106.0	112	.94	h.
II	53-56	Berk.	Bar.	99.0	180	81.68	78.38	81.0	140	.57	s.
II	487	H-B	Sow	110.0	284	87.01	85.04	174.0	140	1.23	h.
II	500	C. W.	Sow	82.0	210	83.33	81.25	128.0	140	.91	h.
III	469	C. W.	Sow	154.0	232	82.63	81.22	78.0	84	.92	s.
III	477	DJ-B	Bar.	140.0	232	82.87	81.02	92.0	84	1.08	m. s.
III	487	Hamp.	"	110.0	208	83.33	81.25	98.0	84	1.15	m. s.
III	136	Berk.	"	92.0	230	84.57	82.76	138.0	112	1.22	h.
III	479	C. W.	"	98.0	244	85.47	83.33	146.0	112	1.29	m. h.
III	485	Berk	"	112.0	240	85.09	83.33	128.0	112	1.13	m. h.
III	80	"	"	56.0	204	82.9	80.83	148.0	140	1.05	s.
III	488	Hamp.	"	118.0	274	86.8	84.80	156.0	140	1.11	h.
III	491	H-B	"	102.0	272	84.56	82.24	170.0	140	1.21	h.
IV	471	D.J.	"	152.0	256	84.42	82.38	104.0	84	1.22	m. s.
IV	473	P. C.	"	144.0	250	84.14	81.50	106.0	84	1.25	s.
IV	481	C. W.	Sow	102.0	210	82.18	80.20	108.0	84	1.27	h.
IV	476	Berk.	Bar.	119.0	218	82.78	80.86	99.0	112	.88	m. h.
IV	492	"	"	110.0	260	85.25	82.79	150.0	112	1.33	m. h.
IV	494	H-B	Sow	86.0	214	83.33	80.88	128.0	112	1.13	m. h.
IV	92	Berk.	Bar.	92.0	264	85.49	83.14	172.0	140	1.22	m. h.
IV	463	Hamp.	"	128.0	256	86.61	85.04	128.0	140	.91	s.
IV	498	C. W.	Sow	70.0	264	85.43	83.46	194.0	140	1.38	m. h.

From the table it is seen that the average daily gain for the entire period per pig was .706 pounds in Lot I, in Lot II .898 pounds, Lot III 1.116 pounds, and in Lot IV 1.165 pounds. The two lots receiving corn naturally made a higher average gain and a slight advantage is noted for the two lots receiving the mineral mixture. Two pigs were slaughtered at the beginning of the tests and from the grading committee's report it is indicated that both were judged as yielding soft carcasses. Of those slaughtered at the end of the four-week hardening period the grading committee's report shows as follows:

Lot I ------- 1 soft, 2 medium soft.
Lot II ------ 2 medium soft, 1 medium hard.
Lot III ------ 1 soft, 2 medium soft.
Lot IV ------ 1 soft, 1 hard, 1 medium soft.

At the end of the eight-week period:

Lot I ------- 1 medium soft, 1 medium hard, 1 hard.
Lot II ------ 2 medium hard, 1 hard.
Lot III ----- 2 medium hard, 1 hard.
Lot IV ------ 2 medium hard, 1 hard.

At the end of the twelve-week period:

Lot I ------- 2 medium hard.
Lot II ------ 1 soft, 2 hard.
Lot III ----- 1 soft, 2 hard.
Lot IV ------ 2 medium hard, 1 soft.

The advantage of feeding corn to firm up the carcasses is indicated from the figures given above. It is also evident that the previous conclusion made that beans produce soft carcasses is well founded.

Mr. Russell:

Are there any questions?

The South Carolina station carried on some soybean grazing work last year. Mr. Du Rant will now report on this work.

Mr. Du Rant:

Object of Experiment

1- To secure further data upon the relative economy of dry lot and forage for producing pork.

2- To determine the quality of pork produced by following the grazing period on soy beans with a finishing period on corn and tankage.

PRESENT STATUS

Two previous trials have been conducted at this station in cooperation with the U. S. Department of Agriculture on soybean forage and the quality of pork produced on this forage. This test is planned to obtain further information on this subject.

PIGS USED

Twenty-five pigs averaging about 60 pounds were used in this test,- 10 pigs in dry lot on corn and tankage and 15 on soy bean forage. These pigs were about 5-1/2 months old and are either purebred or cross-bred Berkshires, Duroc Jerseys, or Poland Chinas. These pigs were raised on the college farm and given the same feed and care before being put on test. The sows received a ration of shelled yellow corn and tankage during both the gestation and suckling period and the pigs received this same ration between weaning and the beginning of the test - (Bermuda pasture was provided for them). The pigs were given the double treatment for hog cholera and the treatment for round worms.

QUARTERS, SHELTER AND WATER

Lot I was fed in a dry lot about 1/10 of an acre in size. Lot II grazed on an acre of Mammoth Yellow soybeans followed by an acre of Biloxi soybeans. Small shed type hog houses and water from pipe line were provided for each lot.

LENGTH OF EXPERIMENT

Lot I on corn and tankage, ran for 98 days until the pigs reached an average of 200 pounds. Lot II ran for 56 days on forage, 31 days on the acre of Mammoth Yellow soy beans, and 25 days on the acre of Biloxi soy beans, and a finishing period of from 42 to 81 days on corn and tankage. An outbreak of flue in the hogs delayed the first shipment two weeks, which made this period 42 days instead of 28.

WEIGHTS.

Individual weights were taken three consecutive days at the beginning and close of the trial and every 14 days during the test.

RATIONS

Lot I. Shelled yellow corn and tankage, full feed - Morrison's Standards.

Lot II. Soybean forage plus 2% ration of shelled yellow corn for 56 days followed by shelled yellow corn and tankage during the finishing period.

COMPOSITION OF FEEDS

	Moisture	Ash	Fat and oil	Crude fiber	Protein	Nitrogen free extract
Yellow corn	12.07	1.35	3.77	1.97	5.12	75.72
Tankage	7.75	21.25	8.61	4.80	58.06	
Mammoth Yellow Biloxi						

MINERAL MIXTURE

The pigs were given free access to the following mineral mixture:

12 parts charcoal
4 parts ground lime stone
1 part salt

PRICE OF FEEDS

The cost of feeds used in this test were:

Corn $1.40 per bushel
Tankage $76.00 per ton
Mineral mixture $20.00 per ton
Soy bean forage $15.00 per acre

FEED SAVED BY ONE ACRE OF SOYBEANS

Based on results of soybean period

	Lbs. Feed	Value of Feed
Corn	1300.9	$32.52
Tankage	254.8	9.68
Total	1555.7	$42.20

TABLE I.

SOY BEAN PERIOD
56 Days - Oct. 7 - Dec. 2
1924-25

		Lot I Corn & Tankage	Lot II Soy bean forage plus 2% corn ration
No. hogs per lot		10	15
No. days in period		56	56
Total initial wt.		604.7	895.3
Av. initial wt.		60.47	59.69
Total final wt.		1392.	2129.3
Av. final wt.		139.2	141.95
Total gain		787.3	1234.0
Gain per pig		78.73	82.27
Av. daily gain		1.41	1.47
Total feed consumed:	Corn	2657.0	1596.0
	Tankage	321	
	Forage		2 acres
	Mineral	20.0	120.0
Av. daily feed:	Corn	4.74	1.90
	Tankage	.57	
	Forage		.0024A
	Mineral	.04	.14
Feed per 100 lbs. gain:	Corn	337.48	129.34
	Tankage	40.77	
	Forage		.16A
	Mineral	2.54	9.72
Cost of feed per 100 lbs. gain:	Corn	$8.44	$3.23
	Tankage	$1.55	
	Forage		$2.40
	Mineral	$ .03	$ .10
	Total	$10.02	$5.73

NOTE: LOT II. 31 DAYS ON MAMMOTH YELLOW, 25 DAYS ON BILOXI SOYBEANS.

TABLE II
THE FINISHING PERIOD

Lot I. 42 days -Dec. 2-Jan. 13
Lot II 81 days -Dec. 2-Feb. 21

		Lot I. Corn and Tankage	Lot II Corn and Tankage
No. hogs per lot		10	11.05
No. days in period		42	81
Total initial wt.		1392	2129.3
Av. initial wt.		139.2	141.95
Total final wt.		2060.7	1427.0
Av. final wt.		206.07	285.4
Total gain		668.7	1632.7
Gain per pig		66.87	147.75
Av. daily gain		1.59	1.82
Total feed consumed:	Corn	2772	7280
	Tankage	235.5	546
	Mineral		61
Av. daily feed:	Corn	6.60	8.13
	Tankage	.56	.61
	Mineral		.07
Feed per 100 lbs. gain:	Corn	414.52	429.8
	Tankage	35.22	33.5
	Mineral		3.74
Cost of feed per 100 lbs. gain:	Corn	10.36	10.74
	Tankage	1.34	1.27
	Mineral		.04
	Total	11.70	12.05

Note: Lot I carried to average of 200 pounds
Lot II finished for 81 days after soy bean period

TABLE III

ENTIRE TEST 1924-25

Lot I. 98 days - Oct. 7-Jan. 13

Lot II 137 days - Oct. 7-Feb. 21

		Lot I. Corn and Tankage	Lot II Soybean forage followed by corn and tankage
No. hogs per lot		10	12.66
No. days in period		98	137
Total initial wt.		604.7	895.3
Av. initial wt.		60.47	59.69
Total final wt.		2060.7	1427. *
Av. final wt.		206.07	285.4 *
Total gain		1456.0	2866.7
Gain per pig		145.6	
Av. daily gain		1.49	1.65
Total feed consumed:	Corn	5429	8876.0
	Tankage	556.5	546.0
	Forage		2 acres
	Mineral	20.0	181.0
Av. daily feed:	Corn	5.54	5.12
	Tankage	.57	.31
	Forage		.0011 A
	Mineral	.02	10
Feed per 100 lbs. gain:	Corn	372.87	398.62
	Tankage	38.22	19.04
	Forage		.0698
	Mineral	1.37	6.31
Cost of feed per 100 lbs. gain:	Corn	$9.32	$7.74
	Tankage	$1.45	$ .72
	Forage		$1.05
	Mineral	$ .01	$ .06
	Total	$ 10.78	$9.57

*Note: 5 pigs were shipped at the end of each 28 days of the finishing period and only 5 pigs were in lot at close of test.

TABLE IV.
INDIVIDUAL RECORD

SOY BEAN PERIOD - 56 DAYS

Breed	Sex	Ear Tag	Initial wt.	Final wt	Total Gain	Daily Gain
Poland China	B	1	43.3	110.0	66.7	1.19
Duroc-Jersey	S	7	65.0	143.0	78.0	1.39
Duroc-Jersey	S	9	53.7	132	78.3	1.40
Duroc-Jersey	B	10	46.3	115.3	69.0	1.23
Berkshire-Hampshire	S	14	39.3	92.0	52.7	.94
Poland-Hampshire	S	86	41.7	111.0	69.3	1.24
Berkshire-Hampshire	S	18	62.3	130.0	67.7	1.21
Boland China	S	22	79.3	181.0	101.7	1.82
Poland China	S	23	63.0	168.0	105.0	1.88
Poland China	S	25	57.3	138.3	81.0	1.45
Poland China	B	33	61.0	159.0	98.0	1.75
Poland China	B	36	79.3	170.0	90.7	1.62
Poland China	B	39	67.7	165.7	98.0	1.75
Poland China	B	88	78.0	163.3	85.3	1.52
Poland China	S	43	58.0	150.7	92.7	1.66

TABLE V.
INDIVIDUAL RECORD

Finishing period on corn and tankage

Ear Tag	Initial wt.	Final wt.	Days on test	Total gain	Daily gain
1	110.0	195.0	42	85.0	2.02
7	143.0	213.0	42	70.0	1.67
9	132.0	221.0	56	89.0	1.59
10	115.3	232.0	81	116.7	1.44
14	92.0	217.0	81	125.0	1.54
86	111.0	188.0	42	77.0	1.83
18	130.0	217.0	56	87.0	1.55
22	181.0	329.0	81	148.0	1.83
23	168.0	338.0	81	170.0	2.10
25	138.3	234.0	56	95.7	1.71
33	159.0	284.0	56	125.0	2.23
36	170.0	311.0	81	141.0	1.74
39	165.7	252.0	42	86.3	2.05
88	163.3	296.0	56	132.7	2.37
43	150.7	235	42	84.3	2.01

TABLE VI.
INDIVIDUAL RECORD
ENTIRE TEST

Ear Tag	Initial wt	Final wt	Days on test	Total gain	Daily gain
1	43.3	195	98	151.7	1.55
7	65.0	213	98	148.0	1.51
9	53.7	221	112	167.3	1.49
10	46.3	232	137	185.7	1.36
14	39.3	217	137	177.7	1.30
86	41.7	188	98	146.3	1.49
18	62.3	217	112	154.7	1.38
22	79.3	329	137	249.7	1.82
23	63.0	338	137	275.0	2.01
25	57.3	234	112	176.7	1.58
33	61.0	284	112	223.0	1.99
36	79.3	311	137	231.7	1.69
39	67.7	252	98	184.3	1.88
88	78.0	296	112	218.0	1.95
43	58.0	235	98	177.0	1.81

TABLE VII
RESULT OF CARCASS TESTS

Ear tag	Days on forage	Days on corn and tankage	Age at slaughter Mo.	Live wt. when taken off test	Committee grading of chilled carcass
20	0	0	5-1/2	45	Soft
45	0	0	5-1/2	74	Soft
46	0	0	5-1/2	68	Soft
1	56	42	8-1/2	195	Medium hard
7	56	42	8-1/2	213	Hard
86	56	42	8-1/2	188	Medium hard
39	56	42	8-1/2	252	Medium hard
43	56	42	8-1/2	235	Medium hard
9	56	56	9	221	Medium hard
18	56	56	9	217	Medium soft
25	56	56	9	234	Medium soft
33	56	56	9	284	Medium hard
88	56	56	9	296	Hard
10	56	81	10	232	Medium hard
14	56	81	10	217	Medium soft
22	56	81	10	329	Medium hard
23*	56	81	10	338	---- ----
36	56	81	10	311	Medium hard

*DIED ENROUTE TO BELTSVILLE

DISCUSSION OF FEEDING RESULTS

During the soybean period two varieties of soybeans were used, the Mammoth Yellow and the Biloxi. Both varieties produced a good crop of beans and the grazing period extended over 56 days, being 31 days on the Mammoth Yellow followed by 25 days on Biloxi.

During the soy bean period the pigs in Lot I gained 1.41 pounds per pig per day, and required 337.48 pounds and 40.77 pounds tankage per 100 pounds gain. The pigs in Lot II gained 1.47 pounds per pig per day and required 129.34 pounds corn and .16 acre of forage per 100 pounds gain. The cost per 100 pounds gain was $10.02 in Lot I and $5.73 in Lot II.

During the finishing period Lot I gained 1.59 pounds per pig per day and required 414.52 pounds corn and 35.22 pounds tankage per 100 pounds gain. Lot II gained 1.82 pounds per pig per day and required 429.8 pounds corn and 33.5 pounds tankage per 100 pounds gain. The cost was $11.70 in Lot I and $12.05 in Lot II. In this period Lot I was taken off after the hogs reached an average of 200 pounds, while Lot II was continued for 81 days, with three shipments to Beltsville during that time.

During the entire test the average daily gain was 1.49 pounds in Lot I. It required 372.87 pounds corn and 38.22 pounds tankage per 100 pounds gain. In Lot II the average daily gain was 1.65 pounds, and it required 309.62 pounds corn, 19.04 pounds tankage, and .0698 acre forage per 100 pounds gain. The cost was $10.78 in Lot I and $9.57 in Lot II.

All pigs made good gains during this test and an outbreak of flue was the only irregularity that occurred during that time.

RESULTS OF CARCASS TESTS

The pigs received shelled yellow corn and tankage and grazed on Bermuda pasture before being put on test. The pigs in Lot II on soy bean forage were shipped to Beltsville, Maryland, and slaughtered under government supervision. The results of this test are given in Table VII.

The first three pigs were shipped at the beginning of the soy bean period and did not receive any soy beans. These three pigs killed soft. No shipment was made at the end of the soy bean period, and the next shipment was made after the hogs had been on corn and tankage for 42 days. Four of these pigs killed medium hard and one hard. After 56 days on the finishing period, two killed medium soft, two medium hard, and one hard. The last shipment was made after 81 days on corn and tankage and one hog killed medium soft and three medium hard.

CONCLUSIONS

Although this work will be continued, a few facts are pretty clearly pointed out by this test.

1- Pigs on soybean forage and corn made faster gains than those in dry lot on corn and tankage.

2- Pigs on forage required only 38.6% as much corn to produce 100 pounds gain as did those on corn and tankage.

3- Soybean forage produced cheaper gains than the dry lot method of feeding hogs.

4- The pigs on soybean forage showed more thrift than those on corn and tankage.

Mr. Russell:

Are there any questions?

We have another test at Beltsville. Mr. Hankins will now report on that.

Mr. Hankins:

The Beltsville experiment was planned the same as the Pennsylvania experiment. Four lots beans with and without mineral and beans with 2-1/2 per cent ration of shelled corn with and without mineral were fed. All lots had a 12 week hardening period on corn and tankage. Killings were made from each of the four lots after 4, 8 and 12 weeks of hardening. Our 3 check pigs on this test killed at 119 pounds average weight with one medium soft and two soft. The average refractive index was 1.4601.

In lot 1 we fed soybeans, corn and mineral during the grazing period. After four weeks hardening we killed 4 hogs and 3 were medium soft and 1 soft, with an average refractive index of 1.4609. The gain ratio was 1:2 with an average initial weight of 94 pounds, 28 pounds gain on the crop and 55 pounds gain on corn and tankage. The average refractive index was 1.4609, which you see classes them as soft hogs. After 8 weeks we had 2 medium hard hogs and 1 soft hog, with an average refractive index of 1.4606. The gain ratio was 1:3.5. In the final killing from this lot there were 34 pounds gain on the crop and 148 pounds on corn with tankage with a gain ratio of 1:4.4. Still we had one medium hard and one medium soft and one soft hog, and the refractive index was 1.4600.

In lot 2 in which the beans were grazed with the 2-1/2 per cent ration of corn the first killing was made after 4 weeks hardening and the hogs were all soft. The gain on corn with tankage was double that made on the crop. After 8 weeks hardening there were 3 medium hard hogs. The average refractive index, however, was 1.4604. The gain ratio was 1:3.5. In the final killing there were 2 medium soft hogs and 1 soft hog. After 12 weeks with a gain of 149 pounds on corn and tankage as compared to 28 on the crop we had a gain ratio of 1:5.3.

In the first killing from lot 3 in which the beans were grazed with mineral mixture self fed there were 3 soft hogs and 1 medium soft hog. The average refractive index after the 4 weeks hardening was 1.4602. These 4 hogs, I might say, had an average live weight at slaughter of 126 pounds. After 8 weeks hardening there were 2 medium hard hogs and 1 soft hog, with an average refractive index of 1.4603. There had been an average of 89 pounds gain on corn and 24 pounds gain on the crop. In the final killing were 1 medium hard and 2 soft hogs, with an average refractive index of 1.4599, which looks fairly good, but the carcass gradings do not look so good. The average live weight at slaughter was 249 pounds. The gain ratio of the final killing was 1:6.

From lot 4, in which beans alone were grazed, after 4 weeks hardening all 4 of the hogs killed soft, with an average refractive index of 1.4609. They made 51 pounds gain on corn as an average following 21 pounds on the crop. After 8 weeks hardening the 3 hogs killed were all medium hard. After 12 weeks matters were reversed and we got 1 medium soft and 2 soft hogs. They weighed 240 pounds as an average and had a refractive index of 1.4601. They made 7 times the gain on corn and tankage that they made on the crop.

The feeding results of this experiment follow:

The fourth test of the soybean grazing experiment conducted at the U. S. Experiment Farm, Beltsville, Maryland, was started September 25, 1924. The experiment was divided into two periods, the grazing period ran for eight weeks from September 15 to November 20, 1924, followed by the finishing period of twelve weeks from November 20, 1924 to February 12, 1925.

The Virginia variety of soybeans was used in the test. The beans were planted in rows, and the hogs turned in to graze when the beans were in the dough stage.

The hogs used in the test were of Spring 1924 farrow and were divided into 4 lots of 10 hogs each and fed as follows during the grazing period.

Lot 1. Soybeans grazed, 2-1/2% corn hand fed, mineral mixture self-fed.
Lot 2. Soybeans grazed, 2-1/2% corn hand fed.
Lot 3. Soybeans grazed, mineral mixture self-fed.
Lot 4. Soybeans grazed.

The following table shows feeding results during the grazing period.

Lot	1.	2.	3.	4.
Method of Feeding	Soybean Grazing 2-1/2% corn	Soybean Grazing 2-1/2% corn	Soybean Grazing Min.mix.	Soybean Grazing
No. hogs on experiment	10	10	10	10
No. hog days on experiment	560	560	560	560
Total initial weight	896	876	884	879
Total final weight	1192	1141	1078	1098
Average initial weight	89.6	87.6	88.4	87.9
Average final weight	119.2	114.1	107.8	109.8
Total gain	296	265	194	219
Average gain	29.6	26.5	19.4	21.9
Average daily gain	.528	.473	.346	.39
Total feed consumed	1614	1464	165	
Shelled corn	1464	1464		
Mineral mixture	150		165	
Pork produced soybean pasture				219
Feed consumed per 100# gain	545.3	552.4	85.05	
Corn " " " "	494.6	552.4		
Min. Mix. " " " "	50.6			
Feed cost per paddock	37.44	33.94	4.95	
" " " 100# gain	12.65	12.43	2.55	

Corn 1.26 per bushel, .0225 per lb.
Mineral mixture .03 per lb.

At the close of the grazing period on November 20, 1924, all hogs were started on the finishing period which lasted for 12 weeks. Each lot was self fed a ration of shelled corn, tankage and mineral mixture.

At the end of the first four weeks of the finishing period 4 hogs were killed from each of the four lots. At the end of eight weeks on the finishing test 3 hogs from each lot were slaughtered leaving 3 hogs in each lot to finish the twelve week period which closed February 12, 1925.

The following table shows feeding results of the finishing period.

Previous feeding (Lot)	1	2	3	4
No. hogs on experiment at start	10	10	10	10
No. hog days on experiment	532	532	532	532
Total initial weight	1192	1141	1078	1098
Average initial weight	119.2	114.1	107.8	109.8
Total final weight	2158	2081	1898	2051
Average final weight	215.8	208.1	189.8	205.1
Total gain	966	940	820	953
Average gain	96.6	94.0	82.0	95.3
Average daily gain	1.81	1.766	1.541	1.79
Total feed consumed	3631	3442	3204	3722
Corn	3122	2978	2775	3236
Tankage	456	410	366	433
Mineral mixture	53	54	63	53
Feed consumed per 100 lbs. gain	375.88	366.17	390.73	390.55
Corn " " " " "	323.19	316.81	338.41	339.56
Tankage" " " " "	47.20	43.61	44.63	45.44
Mineral mixture" " "	5.49	5.74	7.68	5.56
Feed cost per paddock	85.52	80.93	75.31	87.31
Feed cost per 100 lbs. gain	8.853	8.61	9.184	9.17

Corn	.0225
Tankage	.03
M.M.	.03

Mr. Russell:

I just thought at this time we might get away from our routine of results and see if we can find out anything about the wide variation of gains. The Mississippi station has gotten better than 1 pound a day on soy beans alone. At Beltsville we have gotten something like 1/3 of a pound. At Pennsylvania this year they even made a slight loss and North Carolina has made about 1/3 of a pound.

Dr. Jacob:

At what stage do you turn them in?

Mr. Templeton:

When the leaves are yellow or when the beans are a little past the dough stage.

Mr. Russell:

We do not get the gains. I just wondered whether there would be any explanation of the wide variation of gains made in feeding soybeans alone. In some parts of the United States they are urging the use of soybeans as a hog feed. To just what extent I do not know. If the farmer is going to use soybeans he would like to know what his hogs would gain.

Mr. Starkey:

In South Carolina the farmers are using mineral mixture with their beans and are getting very good results.

Mr. Salmon:

What is the color of the Virginia bean?

Mr. Hankins:

It is a brown bean.

Mr. Russell:

In 1923 the addition of mineral showed good results but in 1924 we got better results without mineral than with mineral.

Mr. Hankins:

Last year we got about 3 times the rate of gain on beans with mineral as we did without mineral. With mineral we got .85 of a pound and without .30.

Mr. Starkey:

Our work at the Florence station with feeding soybeans is very satisfactory. Just as soon as we started to use mineral we got better gains. What size is the Virginia variety?

Mr. Hankins:

It is a rather small bean about the size of a pea.

Mr. Templeton:

How does the oil content compare?

Mr. Ellis:

The following are the fat percentages on the different varieties of soybeans which have been fed at several of the stations:

Virginia (Beltsville)	17.50 - 18.50
Mammoth Yellow (Miss.)	17.17 - 20.08
Biloxi (South Carolina)	19.24
Mammoth Yellow (South Carolina)	16.9 - 18.5
Ito San (Indiana)	17.4

Mr. Russell:

We have a matter I want to bring to the attention of this meeting.

I think it would be well to take it up now. By way of introduction I will say that it came to our notice last fall that there was considerable of an increase in the northern markets of soft hogs and we were asked as to what extent soybeans might be a contributing factor.

It is well known to packers and market men that soybeans are being grown quite extensively and that they will produce soft pork if fed in sufficient amounts. They also know that on account of the quality and quantity of corn raised last year, many immature hogs, that would grade soft, were sent to market.

The question is to what extent soybeans have been a factor in the receipts of soft hogs at the western and northern markets.

Some six weeks or two months ago the question was raised in our office as to whether or not a press notice should go out to the general press and also the station directors throughout the country calling the attention of the farmers to the fact that soybeans if fed in sufficient amounts will make soft pork, with a word of caution on the unlimited use of this feed. We would like to have this meeting say something about it. If there is any bunch of men in this country who understand the soft-pork problem it is this group. The soybean is a national problem. It is being fed in the corn belt, cotton states and in the northern part of the country and we should not confine our discussions or efforts to the corn belt alone. I will ask Mr. Ferguson to give us what actual information he can and also his own ideas on the subject.

Mr. Ferguson:

About fourteen or fifteen years ago we started on this problem. Since then the problem has extended.

Originally we had very little sympathy outside of the central south. The corn belt states told us that soft pork was and would continue to be distinctly a problem of the central south. We labored for some time before we could get anyone to listen to us. Finally we held a conference at Auburn, Alabama, and when we seemed to get nowhere, I made the statement that beginning the following Monday morning, Swift & Company would buy hogs on a strictly graded basis. In other words, we would recognize soft hogs as standard for the central south. While we would not buy them at a discount, we would reverse the situation by paying a premium for hard hogs. Things began to move soon afterwards.

I realize that the southern hog producer has a more difficult problem than the northern producer account inferior shipping and marketing facilities in many places. For instance, Mr. Hostetler told me this morning that recently in one town in his territory dressed pork was selling at 10¢ per pound and that twenty-two miles away the price was 18¢ per pound. In other words, stabilized prices do not govern live stock marketing in certain areas in the south. This, of course, is because sales are made locally and central packing plants are not available. When this condition

is improved, standardized grading with corresponding prices will undoubtedly apply to hogs, both hard and soft, produced in the south.

The feeding of soybeans to hogs has become quite general in several states. You people who have worked for years on pork production problems have found that the soybean northern boundary has gone up steadily until soybeans are now produced on considerable acreage as far north as Minnesota and Iowa. For instance, about four months ago we received a letter from the manager of our So. St. Paul plant wanting to know why he was getting so many soft hogs. He showed that in 1924 he received four or five times as many soft hogs as he had received at any time before from the same area. Our next Northwest point is Sioux City. The same condition was true there.

The question we are now facing is - How far will soybean production cover the country and to what extent will it be a factor in producing soft pork. In Indiana, Illinois, Wisconsin, Iowa, Minnesota, and Missouri, where soybeans are grown, they are largely fed as such. I know of no mills now extracting the oil on a commercial basis. This to the packer means that soybeans have become a factor in pork production in the north with possibility that they may be a factor in causing an increased percentage of soft hog carcasses.

As a result of the cases mentioned, some of our people began correspondence with some of the experiment stations, particularly Indiana, with the idea that perhaps the time had arrived when the stations might properly call the attention of producers to the possible danger from feeding soybeans in quantity. It seems to us that the matter could be handled in a conservative and careful way by the stations cooperating with Mr. Russell's Department.

What we had particularly in mind was to anticipate possible damage and not wait until a condition developed in the north such as we have seen in Georgia and Alabama in certain areas. If there is danger to the quality of pork produced by the feeding of soybeans, it seems to us it is the duty of the State Experiment Stations interested to sound a timely warning.

Four years ago I submitted to this meeting a suggestion that perhaps some work might properly be done by agronomists and soil experts cooperating with Animal Husbandry Departments in both Federal and State Experiment Stations to determine the possibility of producing one or more varieties of soybeans rich in protein and low in oil. I understand there is at this time a variation in oil content from 10 to 24%.

Regarding the large numbers of soft and oily hogs found in the north last year, we do not lay any considerable percentage of these at the door of soybeans. I believe the unusual proportion of soft corn and the enormous crop of low-grade oats and other low-grade feed stuffs were to a considerable extent responsible. You probably are aware that there was less commercial feed bought and used last year than previously. The unsatisfactory corn crop and the superabundance of oats, together with the desire of the feeder to force his hogs to rapid gains and market weights at an early age,

all helped add to the unfavorable condition.

I am pleased to note that Mr. Hankins and others are stressing the factor of maturity or immaturity in relation to soft pork. I believe this will have more attention as your work proceeds.

While it is desirable to produce protein on the farm, as a matter of economy, if this can be done without injuring the quality of meats produced, regard should be had at all times for the quality of the finished product and the taste and opinion of the ultimate customer. Consequently, we believe the time is ripe for a word of official caution as before indicated.

As to the bulletin which the Federal people proposed to print, it seems to be very clear, definite, and comprehensive. I understand the Department contemplates a very limited edition. It seems to me, if printed, it should have a wide distribution. If you men from state experiment stations can persuade your directors to print and distribute this bulletin on your station mailing lists, it would reach a great many people who would be interested and directly benefited.

Our second suggestion is that in addition to the department bulletin a small press bulletin might well be prepared for publication by farm and live stock papers over the country. Believe the notes for this bulletin as submitted by Mr. Russell would cover the matter very well indeed and that this bulletin would be in order shortly so as to be in time for this season's work on farms.

Please bear in mind we are merely suggesting these things. The carrying out of the suggestion rests entirely in the hands of yourselves and your associates.

There is also possibility that the Institute of American Meat Packers might be willing to take care of a reprint edition and see that it went where it would be helpful.

Several station workers have asked for our attitude towards soybeans in pork production. It is this: We believe that under proper conditions up to certain limits soybeans may be fed with safety and profit and that where they are fed carelessly and excessively, serious damage may result to finished product.

In conclusion I wish to compliment you upon the splendid consecutive work already so successfully pursued. You have done a lot in five years but it will probably require five years more before the data secured will justify making definite conclusions.

I appreciate being with you and assure you of the best wishes of the packing industry for success. Whenever there is a possibility for us to cooperate with you, we shall be pleased to do so.

Mr. Russell:

It is a pleasure for all of us to hear what Mr. Ferguson has to say. I notice in particular the proposed bulletin. The compilation of this bulletin has been done by Mr. Hankins and Mr. Ellis with the assistance of the cooperating agencies but I really can not help but think it is to be more valuable than just the soft pork end of it.

But to get back to the question of soybeans I told you our office raised this question about putting out a word of warning. I do not doubt but back of it was the thought of the havoc that had been played by some misinformation that had gone out about production of soft pork in the south some years ago. We will believe the things we like to believe. It is pretty hard for some of these farmers in the south to have us tell them that if they fed peanuts for 8 weeks and then give hardening feeds for 8 weeks there will be soft hogs. I think it would be in line right now for me to read a proposed press notice that was gotten up by the department.

Soybeans and Soft Pork

"Corn-belt markets report an increase in the receipts of hogs that kill soft and oily. The terms, "soft" and "oily," are used to designate hogs, the carcasses of which remain soft when chilled at the temperatures commonly employed in commercial meat packing plants. As soybean production has rapidly increased throughout the country, including the corn belt, the question is raised as to what influence this has had on the condition reported.

For several years the U. S. Department of Agriculture, in cooperation with several of the State agricultural experiment stations, has been engaged in making a study of the entire soft pork problem. The following facts have been brought to light and further work is in progress.

1. Soybeans, when fed to hogs in sufficient proportions, even with such a feed as corn, will produce soft or oily pork.

2. Products from a soft hog are discriminated against to a greater or less degree in commercial channels.

3. The softness or hardness of an animal cannot be determined until after slaughter.

4. The soft-pork problem is largely a soft-fat problem.

5. The principal factor in the production of soft fat is feeds such as soybeans, peanuts, etc., which contain high percentage of oils of low melting point.

6. A 2-1/2 per cent ration (daily feed of 2-1/2 per cent of the animal's live weight) of shelled corn fed with soybeans (the latter unrestricted) will not produce hard hogs, at least when they are started on feed at 100 pounds or less in weight.

The usual method of feeding soybeans to hogs is to plant them in the same field with corn and harvest the two crops by "hogging-down." The proportion of beans to corn that will be consumed may depend considerably on the variety and quality of both the corn and beans, as well as on the degree of maturity of the crops, and on other factors. In the light of present knowledge, there is a possibility of producing soft pork in the hogging-down method of feeding.

As soybeans is a soil-improving crop and produces a home-grown feed of high-protein content that is valuable for practically all classes of livestock, its production should not be discouraged. A word of caution regarding its use as a hog feed, however, is warranted. Until more information is available, it is recommended that soybeans be used only as a protein supplement to corn or other starchy concentrates."

Mr. Hostetler:

I read this article some time ago when I was in Washington. Mr. Hankins showed it to me and it impressed me very favorably at the time and I think it should be put out. From my standpoint I would be glad to hear this body vote on putting out this press notice. In fact, if it is in order I will make this a motion.

Mr. Russell:

I think it would be well for Mr. Vestal to tell us all he can about this question.

Mr. Vestal:

As you know in Indiana we have already objected to a part of this statement. Our objection was raised on the one point where it stated that the usual way of feeding was to plant soybeans with the corn and hog them down with the corn. It is true, that is the way most of our soybeans are fed, although we have been feeding some in dry lot. In light of the fact that our experimental work in cooperation with the Bureau of Animal Industry has shown that our hogs have killed hard or medium hard we felt that was making a misrepresentation of conditions in Indiana. We felt that this report was based mainly upon the results of feeding soybeans alone or grazing soybeans with a 2-1/2 per cent ration of corn. The results of such feeding tests would not apply to the use of soybeans as a supplement to corn. Neither would it apply to the use of soybeans in the corn field to be hogged down. Since very few of our farmers graze beans alone or with a limited ration of corn we felt that it would be misleading.

Mr. Russell:

Mr. Vestal said and it is true that the usual manner of feeding is to hog them down. I think it would be well to find out what the practice is of feeding beans in different states.

Mr. Templeton, what is the way in Mississippi?

Mr. Templeton:

I believe the practice is to gather the corn and turn the hogs in and let them harvest the beans and hand feed corn. You have to force the hogs to utilize the beans.

Mr. Russell:

Mr. Quesenberry, how do you use soybeans?

Mr. Quesenberry:

There are very few soybeans fed to hogs in our state.

Mr. Starkey:

In South Carolina most of the corn is gathered and some fed back and some do not feed it at all.

Mr. Russell:

If I am right the system in South Carolina is like that of Mississippi.

Mr. Salmon:

In Alabama they have not been using them to a very great extent. The usual procedure is to turn them in and let them hog them down together.

Mr. Edwards:

In Georgia they use both methods.

Mr. Hostetler:

In North Carolina the beans that are used for hogs are usually beans by themselves. However some of our farmers are hogging the two off together. They usually salvage the waste product.

Dr. Jacob:

In Tennessee they hog off corn and soybeans together.

Mr. Cocke:

In Virginia the process is the same as in Tennessee. They hog down corn and soybeans together.

Mr. Ferguson:

There is another thing that I think you all know. I have some friends who are in the oil meal business. They tell me the more beans they have put into the mill the more money they have lost. The marketing of these beans commercially is not going to have much of an impetus for some time to come. They have to heat the beans to a very high temperature and when they get through with it there is no profit. Aside from beans used as feed you will find that the tendency is more and more, as the acreage increases, to let the hogs hog down the crop.

Mr. Russell:

We have another question I would like to ask. Is the process of grinding these beans followed to any extent?

Mr. Vestal:

I think many of our farmers who have fed fresh beans have ground them. We formerly thought the hogs would not eat them unless they were ground. We still continue to have favorable results on ground beans. In the last couple of years we have fed the whole threshed bean with the ground bean and have gotten equally as good results.

Mr. Russell:

There is one angle to this question that has come to our minds. That is the area. If you put hogs on an acre where there is corn and soybeans are they going to get their proportions as well as if they had 15 acres.

Mr. Templeton:

What yield of beans do you get with your corn?

Mr. Vestal:

We really have not attempted to estimate any yield. I suppose it would run maybe 5 to 10 bushels to the acre and the corn from 40 to 50 bushels to the acre. That is 1 bushel of beans to 8 to 10 bushels of corn.

Dr. Jacob:

I believe the factor of size has a great deal to do with the question of corn and soybeans. The little hogs do not get the corn like the larger hogs.

Mr. Russell:

Another question is the length of time of the grazing period.

Mr. Vestal:

In Indiana it is about 5 weeks.

Dr. Jacob:

In Tennessee it is about 8 weeks.

Mr. Templeton:

In Mississippi it is about 8 weeks using different varieties.

Mr. Du Rant:

In South Carolina it is from 30 to 50 days.

Mr. Edwards:

In Georgia it is from 45 to 50 days.

Mr. Cocke:

In Virginia it is about 8 weeks.

Mr. Russell:

We have some more data on feeding corn and soybeans free choice in dry lot.

Mr. Vestal:

Where we fed corn, beans and mineral free choice we have had a variation of from 1 part beans to 3 to 16 parts corn. The usual range was from 1:5 to 1:10. We have had 3 groups of hogs which ate a very narrow proportion of corn and beans, two free choice and one when the feed was mixed. Where the ration has been narrow soft hogs have been produced. Several soft hogs have been produced on 1:3.9 and some soft on 1:4.4. I might say in regard to the heavy consumption of beans that it was by rather young pigs. It is too expensive to feed them that way.

Mr. Russell:

One thing that we want to bear in mind in arriving at a solution is that we are covering the United States in the proposed press notice. I think we all agree that the soybean problem does cover the country.

Dr. Jacob:

Can you say that a statement of this kind applies to every variety?

Mr. Russell:

No. We have little if any information regarding the results by comparing varieties.

Mr. Cocke:

Do you suppose the color has anything to do with the hogs going after the beans?

Mr. Russell:

I have discussed the question of color with the Plant Industry people of the Department and they think that color may have a direct relation to palatability.

Mr. Salmon:

In regard to this statement I would not like to see that agitated very much in Alabama. It is hard enough to get them to grow any kind of a crop. I think a great many people would object to growing soybeans if we got out a statement of that kind.

Mr. Templeton:

Our question now is producing meat for home consumption, not for market.

Mr. Russell:

Any conclusions we draw should be on the results of all the work done at cooperating stations and not what any one station may have done.

Mr. Vestal:

I think we should use all the material we have but I do not think we have enough material to use.

Dr. Ellinger:

Right before I left Chicago I was to a meeting of the improved livestock committee of the Institute of American Meat Packers and the question was soybeans. It was brought out by a representative of Swift & Company. The question was discussed whether it would be worth while and right to sound a warning. I brought up the point that I was planning to attend this conference and I thought if the soft pork conference would take any step it would be very much more preferable than for the packers. The committee decided to let the thing rest until we heard what was coming from this conference.

Mr. Hostetler:

The reason I spoke as I did a while ago was because from our standpoint in North Carolina we do not hesitate to tell our people that they are on thin ice in the production of soft pork when using soybeans as a hog feed. Our extension men are stressing that. I realize that our conditions are different from what they are in South Carolina and in other southern states. Large numbers of our farmers are using soybeans. They harvest them and then use the hogs to glean what is left. We have done some work along that line and this year we shipped our hogs to Richmond and some of the hogs were soft but I believe it was a matter of immaturity instead of corn and soybeans. We do not recommend that these people grow soybeans for hogs as such. I think it is a mistake. I think soybeans a great crop and there is a place for it in hog production but I think we might go too far.

Mr. Salmon:

Whenever we know the facts I am in favor of giving these facts to the people. I think that when we get conclusive facts we should make a conclusive statement. A circular letter looks too much like propaganda. I just wonder if an action of this kind might be premature unless we should tell them how to plant them in the corn and feed them to the hogs.

Mr. Hostetler:

Why not let the committee settle this thing.

Dr. Jacob:

To what extent are the different causes of the soft hogs which are coming into this area attributed to soybeans?

Mr. Ferguson:

These local plant managers who are not as closely identified with this question as some of the rest of us may jump at conclusions as the feeding of soybeans to hogs is something rather new in their territory.

Dr. Ellinger:

I happened to see a letter from an eastern packer who gets his hogs from eastern St. Louis and Kansas and in this he said "you had better look out where your hogs are coming from." He said they were coming from the soybean area.

Mr Hostetler:

What would be the average yield of corn and soybeans grown together? What yield might you expect on corn and soybeans grown together.

Mr. Queconberry:

We get 9 bushel Biloxi beans that were gathered and between 18 and 20 bushel of corn.

Mr. Hoatetler:

In other words there you get practically 2 pounds to 1 while in your case Mr. Vestal you get 40 bushel with a minimum of 10 bushel or 4:1. The difference in the type of your soil would change that figure in different sections of the country. While we might produce hard hogs in one section we might produce soft hogs in another section. In North Carolina I would say we get 30 bushels of corn to 5 of beans.

Mr. Cocke:

Last year we had a very satisfactory yield of beans. We pulled these beans up and had 10 bushel yield to the acre and 40 bushels of corn. From an agronomy standpoint I would like to ask these gentlemen if the addition of 5 to 10 bushel and the increased palatability does not offset some discrimination against the pork produced until we know positively that this thing is producing soft pork?

Mr. Starkey:

In our work we have made cheaper pork on soybeans and corn than anything we have used so far. The acreage has increased 300 per cent in South Carolina in one year. Our extension men have been boosting them all the time. I think that soybeans is a wonderful crop for South Carolina.

Mr. Ellis:

It seems to me that the soft hogs that have been coming into the northern markets supposedly softened on soybeans must have come from farms where soybeans were fed alone or with a very small supplement. Our data on the corn and soybeans hogged down is as you know very incomplete. We have two statements out that soybeans with 2-1/2 per cent ration of corn and when grazed alone are softening. If they were incorporated into this statement with the idea of calling attention to that fact and not incriminating the practice of hogging down corn and beans I think it would be all right.

Mr. Russell:

We will refer the whole question to the committee and ask them to report to us tomorrow.

We will now adjourn until 9:30 tomorrow morning.

Wednesday Morning

Mr. Russell:

We will now come to order.

You remember yesterday we had the reports on experiments in which soybeans were grazed followed by corn and tankage in dry lot and Mr. Hankins has a summary of that work on which he will now report.

Mr. Hankins:

We divided the hogs into 3 groups according to initial weight, those averaging 70 pounds in the first group, those averaging 100 in the second and those averaging 130 pounds in the third group. (Charts III and IV). The actual limits of initial weights were up to 84 pounds, from 85 to 114 pounds and from 115 pounds up. Except in the case of the 70 pound pigs the pigs in each group were sub-divided according to the gain made on soybeans. The 70 pound pigs made an average gain on soybeans of 13 pounds. One hundred seventeen pounds subsequent gain on corn with tankage were required to lower the refractive index to 1.4601.5. This is a gain ratio of 1:9.

Even if these hogs had no soybeans starting at a weight of 70 pounds plus the 13 pounds gain they would not have been hard hogs. A progressive hardening would have occurred on corn whether they had any softening feeds or not. The 13 pounds gain on soybeans, however, did have a considerable influence. There was about 5 points difference in refractive indexes between these hogs at slaughter and the condition you would find in corn-fed hogs at similar weight.

The 100 pound pigs are shown in 3 groups according to gains on soybeans and with the corresponding gains on corn necessary to lower the refractive index to 1.4601.5. The gain ratios necessary to attain that degree of firmness in the different sub-groups were 1:2.3, 1:3 and 1:5.7.

With the heavy pigs we again have the 3 different sub-divisions according to soybean gain and with the corresponding gains on corn necessary to lower the refractive index to 1.4601.5. These gain ratios were 1:2, 1:3.5 and 1:6.

It is significant that in none of the sub groups does a narrower gain ratio than 1:2 lower the refractive index to 1.4601.5.

These summaries represent data on

Heavy weight	group		39 hogs
Medium	"	"	44 "
Light	"	"	14 "

In the 100 and 130 pound groups we probably have enough information to draw some dependable conclusions. We had hoped that after this meeting we could publish something based on these results.

We will now take up a summary of hogs grazed on soybeans with a 2-1/2 per cent ration of shelled corn hand-fed and with or without minerals self fed. The hardening ration was corn with tankage.

These hogs are shown in 4 groups (charts V, VI and VII), according to initial weights. The average initial weights of the 4 groups are approximately 40, 70, 100 and 130 pounds. With the exception of the 40 pound group these are sub-grouped according to gains made on the softening ration. The following table shows the groups with the (1) gain on softening feed, (2) gain on hardening feed necessary to attain 1.4601.5, and (3) gain ratio, for each. This summary represents 110 hogs.

Gain on softening feed	Gain on hardening feed to attain 1.4601.5	Gain ratio
	40 pound pigs	
65 pounds	98 pounds	1:1.5
	70 pound pigs	
86 pounds	113 pounds	1:1.3
37 "	131 "	1:3.5
13 "	117 " to 1.4604	
	100 pound pigs	
63 pounds	102 pounds	1:1.6
35 "	100 "	1:2.9
20 "	100 " to 1.4606	
	130 pound pigs	
87 pounds	40 pounds	1:.46
65 "	51 "	1:.78
40 "	46 "	1:1.15

Mr. Russell:

Are there any questions?

Mr. Salmon:

It looks like it required a much greater gain on corn than was made on soybeans to produce medium hard hogs when the gain on soybeans was low.

Mr. Hankins:

I think that is a fact. Of course, there are two factors. The soybean is softening but there is this fact, that a 70 pound pig making 13 pounds gain weighs only 83 pounds. The 83 pound corn-fed pig, we know, is a soft pig. Even if he had had no soybeans it would take quite a little

corn gain to make him a hard hog. Where we get a slow rate of gain on this kind of grazing it seems to require a lot of subsequent gain on corn to get them up to a firm condition.

Mr. Russell:

In other words for best results as far as getting commercial hard hogs is concerned it is getting well-bred stuff that matures well.

Mr. Hankins:

This is another summary which we had hoped would form a basis for a conclusive statement.

We have done considerable work with these 2 lines of hardening, hogs grazed on beans alone and with the 2-1/2 per cent ration of corn and we all are inclined to feel that neither system of feeding is any too practical. Therefore, if it is at all possible for us to conclude on these lines of hardening work let's do it.

Mr. McDowell:

May I ask another question? What rate of gain do you get on soybeans alone?

Mr. Hankins:

Mr. McDowell, we have had an average daily gain on soybeans alone running all the way from about 1/5 of a pound a day to over 1 pound a day at the different stations. At Beltsville we are not able to get over 1/3 of a pound a day on beans alone with any degree of consistency. I think we all will agree that that system of feeding is not a practical one in most cases.

Mr. Ferguson:

Soybeans are not distinctly a basal feed. Why is it not recommended that there is some way in which they should be fed.

Mr. Hankins:

We do not think that many of the stations are recommending soybeans as a basal ration.

Mr. Ferguson:

Some of the stations that do not know are giving a wrong impression. Mr. Russell, I think this should be stressed.

Mr. Hankins:

Of course there is a great deal of work to be done with soybeans as a supplementary feed.

Mr. Russell:

I think I made the statement yesterday that in reply to inquiries, (there are not so many but still quite a number) that come into the Washington office we always advise that soybeans be used only as a supplement to corn or other carbohydrate feed. I wonder if it would not be a good idea to know what the states are doing in this respect. Mr. Hostetler, do you get these inquiries?

Mr. Hostetler:

We get some of them but our extension man, Mr. Shay, is not much in favor with soybeans as a hog feed. In other words he is rather discouraging the use of them as a fattening crop. I rather agree with his attitude, when they are used as some farmers use them. They turn the hogs out in the field and let them eat the soybeans and peanuts. The thing we are trying to do is recommending that the farmers use their fall-farrowed pigs for gleaning their fields. In other words have fall pigs farrowed in late July or August or early September then let the sows and pigs gather what beans may be left after harvesting and then put the pigs in dry lot and finish them on corn with some protein supplement from the last of March until about the first of July. We can utilize our softening feeds this way.

Mr. Russell:

Mr. Vestal, do you recommend soy beans as a supplement only?

Mr. Vestal:

Yes, we do.

Mr. Russell:

Have you an opinion as to whether or not it is generally followed in the corn belt?

Mr. Vestal:

It is the only practice in the corn belt.

Mr. Russell:

I do not think that the corn belt farmers should consider soybeans as a basal feed. I notice this year when we have a great many inquiries regarding substitutes for corn.

Mr. Edwards:

We only recommend it as a supplement.

Mr. Cocke:

Soybeans as a basal feed is only recommended as a pasture crop not as a finishing crop. In the corn the animal consumes only the soybeans he wants and it would really only be a small percentage of the total feed consumption. The majority of the feed is taken from the corn.

Mr. Starkey:

I would like to ask what percentage of corn a hog would eat on self feeder with corn and on soybean pasture.

Mr. Hankins:

The Kentucky station did some work along that line several years ago. I have no figures in mind on the feed consumption. In a general way though the hogs were inclined to stay around the self feeders and eat the corn, letting the beans take care of themselves.

Mr. Hostetler:

I might say last year we started a piece of grazing work using soybeans as a temporary grazing crop. We grazed spring oats and when the oats matured we followed with soybeans, but the pigs on self-feeders in soybeans practically paid no attention to the soybeans. They ate a few of them but the pasture was practically as good when we took the pigs out.

Mr. Russell:

I think by the way of suggestion at this time that we might consider putting out a statement from this meeting to the effect that soybeans be considered as a supplement to corn rather than a basal feed.

Mr. Hostetler:

I think that as far as soybeans are concerned in the south we are overlooking the effect of this plant as a grazing crop. We need a plant that will build up our soil and at the same time furnish us good pasture. I think we have this in the soybean.

Mr. Russell:

At Beltsville some 5 years ago we began using soybeans with peas and oats as a pasture crop, turning in the hogs when the beans were 6 or 8 inches tall. Since then we have eliminated the peas and oats as we find we are getting more pasture with soybeans alone.

Mr. Russell:

Dr. Jacob will report on soybeans and corn hogged down.

Dr. Jacob:

This experiment was started on October 10, 1924, and terminated February 2, 1925. Fifteen pure-bred pigs were included, consisting of 3 Berkshires and 12 Durocs. Of these, 1 Berkshire and 2 Durocs, averaging 81.6 pounds in weight were used as checks, which were shipped to Beltsville for slaughter at the beginning of the experiment. The report of carcass grading for the check pigs was, 2 medium soft and 1 medium hard. The remaining 12 pigs averaging 75.8 pounds in weight were grazed on corn and soybeans for 61 days and made an average daily gain of .69 pounds. At the time the pigs were turned on corn and soybeans, the pods were distinctly brown. At the end of the grazing period 6 pigs were shipped to Beltsville, out of which 3 were graded soft, 1 medium soft, 1 medium hard and 1 hard. The remaining 6 pigs were put on hardening feed consisting of corn and tankage self-fed. After 28 days on hardening feed 3 pigs were shipped to Beltsville for slaughter and the report on carcass grading was 1 soft, 1 medium soft and 1 medium hard. On the day they were shipped these 3 pigs weighed 150, 145 and 143 pounds each and had gained 37, 40 and 26 pounds, respectively, or an average of 1.22 pounds a day. The remaining 3 pigs were shipped to Beltsville for slaughter after having been self-fed on corn and tankage in dry lot for 56 days. The carcass grading report was 2 hard and 1 medium hard. These 3 pigs weighed 197, 189 and 189 pounds each with a corresponding gain during the dry lot period for each pig of 34. 67 and 78 pounds, or an average daily gain of 1.36 pounds.

During the first 28 days in dry lot the pigs were fed white corn and a rather low grade tankage. The feed consumed was at the rate of 352.1 pounds of corn and 103.6 pounds tankage or a total of 455.7 pounds of concentrates per 100 pounds of gain. During the last 28 days of dry lot feeding, yellow corn and high grade tankage was used and for 100 pounds gain it required 277.6 pounds corn and 40.6 pounds tankage or a total 318.1 pounds of concentrates.

Mr. Russell:

Are there any questions?

Mr. Vestal:

How about the rate of gain on yellow corn as compared with white corn.

Mr. Hostetler:

Was the corn of the same quality?

Dr. Jacob:

The yellow corn was of a better quality. The white corn was of a rather low quality.

Mr. Hostetler:

Don't you think if there was any difference in the two kinds of corn it was more in quality than in color?

Dr. Jacobs:

I am not absolutely sure about that.

Mr. Russell:

In connection with Dr. Jacob's work I would like to bring up this point. That is the necessity of getting a grading and analysis of the feeds used in our various experiments. In our own work at Beltsville we use nothing but No. 2 yellow corn. When we ask for bids it is always for No. 2 yellow. At our outside stations we follow the practice, on any feeding test, of getting at least a two-pound sample of the feed they are feeding for chemical analysis and grade. It really gives us some very interesting and necessary data. We have depended to a considerable extent on the Bureau of Chemistry at Washington to do our analyzing work, due to the fact that Mr. Ellis has not the time. If this meeting desires we will undertake to give you the analysis of the feeds you use. We will ask the committee to consider this and report.

Mr. Hankins:

This chart (chart VIII), based on results from 53 hogs, shows the variation in degree of firmness produced by corn and soybeans hogged down. Of course, no conclusion seems possible. I will pass this chart around in order that you may examine it more closely.

Mr. Russell:

Some work has been done by the Indiana station in feeding corn and ground soybeans. Mr. Vestal will give us the results of that particular part of the work.

Mr. Vestal:

We formerly felt that we were outside of the soft pork section. In 1921, 22 and 23 I believe all the hogs we sent in for slaughter were either hard or medium hard. Our work of the past year gave a little different result. In some cases the methods of feeding were of marked difference, but yet I realize that we do have a soft-pork problem and that our problem is really more of finding a way of preventing soft pork rather than making hard hogs out of soft ones. We feel that there are certain ways in which

we can feed soybeans and be reasonably safe and yet it has not been prevented. The hogging off of soybeans and corn is a fairly safe practice. The feeding of soybeans free choice with corn on legume pasture is fairly safe. Free choice in dry lot with young pigs is not a safe practice and to older hogs is a questionable practice.

The following is a result of our last year's work.

Experiment I

During the summer of 1924 six lots of hogs were fed to compare soybeans and tankage as supplements to corn for fattening hogs in dry lot and on alfalfa pasture. Also to compare soybeans with and without mineral additions as supplements to corn in the fattening ration.

Spring pigs averaging approximately 74 pounds were used in this experiment. They were started on feed June 26 and each lot finished in the feeding trial when it had made an average gain of 120 pounds to the hog.

Ten hogs were fed in each lot. The lots and rations were as follows:

Dry Lot

Lot 3. Shelled corn and ground soybeans self fed free choice.

Lot 4. Shelled corn, ground soybeans and mineral mixture self fed free choice.

Lot 5. Shelled corn and tankage self fed free choice.

Alfalfa Pasture

Lot 9. Shelled corn and ground soybeans self fed free choice.

Lot 10. Shelled corn, ground soybeans and mineral mixture self fed free choice.

Lot 11. Shelled corn and tankage self fed free choice.

All lots had access to pressed block salt.

The mineral mixture was composed of 10 pounds wood ashes, 10 pounds 16% acid phosphate, and one pound common salt.

Following the feeding period seven hogs from each lot were shipped to the Beltsville station for carcass tests.

The hogs fed corn and soybeans in dry lot ate 1 pound of soybeans to 3.8 pounds of corn. Their grading according to refractive index figures was 5 soft and 2 soft and oily.

The hogs fed corn, soybeans and minerals in dry lot ate 1 pound of soybeans to 3.9 pounds of corn. Their refractive index grading was 1 medium hard, 2 medium soft and 4 soft.

The hogs fed corn and tankage graded 6 hard and 1 medium hard.

The hogs fed corn and soybeans on alfalfa pasture ate 1 pound of soy beans to 7.7 pounds of corn. Their refractive index grading was 4 hard, 2 medium hard and 1 medium soft.

The hogs fed corn, soybeans and mineral on alfalfa pasture ate 1 pound of soybeans to 14.1 pounds of corn. Their refractive index grading was 5 hard and 2 medium hard.

The hogs fed corn and tankage all graded hard.

The refractive index gradings correspond very closely to the committee gradings. Four slight variations occurred in the grading of 35 carcasses.

The results of this experiment taken alone indicate that if soybeans and corn are fed in a ratio of 1 to 4 or narrower than 1 to 4 to fattening hogs in dry lot soft pork will be produced.

Experiment II

In the winter of 1924-25 five lots of hogs were fattened in dry lot to study the effect of different proportions of soybeans and corn on the fat produced. Also to compare the effect of different proportions of these feeds on the rate of gain in the hogs.

Late spring pigs averaging approximately 124 pounds were used in this experiment. They were started on feed November 18 and were fed for a period of 80 days. These hogs were not all as well grown as they should have been at their age, but were in good thrifty feeder condition when put into the feed lots. Ten hogs were fed in each lot. The lots and rations were as follows:

Lot 1. Mixture of ground corn 12 parts and tankage 1 part by weight self fed free choice with a mineral mixture.

Lot 2. Mixture of ground corn 12 parts and ground soybeans 1 part by weight self fed free choice with a mineral mixture.

Lot 3. Mixture of ground corn 9 parts and ground soybeans 1 part by weight self fed free choice with a mineral mixture.

Lot 4. Mixture of ground corn 6 parts and ground soybeans 1 part by weight self fed free choice with a mineral mixture.

Lot 5. Mixture of ground corn 3 parts and ground soybeans 1 part by weight self fed free choice with a mineral mixture.

All lots had access to pressed block salt. The mineral mixture was composed of 10 pounds wood ashes, 10 pounds 16% acid phosphate and 1 pound common salt.

Following the feeding period the hogs were shipped to the Beltsville station for carcass tests.

Eight hogs fed corn and tankage were slaughtered. Their refractive index grading was 5 hard and 3 medium hard.

Nine hogs fed soybeans and corn - 1 to 12 - were slaughtered. Their refractive index grading was 3 hard, 1 medium hard, 3 medium soft and 2 soft.

Nine hogs fed soybeans and corn - 1 to 9 - were slaughtered. Their refractive index grading was 3 hard, 3 medium hard, 1 medium soft, 2 soft.

Ten hogs fed soybeans and corn 1 to 6 - were slaughtered. Their refractive index grading was 2 medium hard, 2 medium soft and 4 soft.

Ten hogs fed soybeans and corn - 1 to 3 - were slaughtered. Their refractive index grading was 9 soft, and 1 soft and oily.

The committee gradings in this experiment were at variance with the refractive index gradings in 25 out of 46 cases. In the majority of cases where variations occurred the committee grading was one grade higher than the refractive index.

The results of this experiment indicate that if soybeans and corn are fed in a ratio of 1 to 12 or narrower to fattening hogs in dry lot there is danger of producing soft pork. However, this result is at variance with all earlier tests with hogs from the Purdue station in that previously no soft hogs had been produced on corn and soybeans when the ratio of soybeans to corn was 1 to 8 or wider. Furthermore, it should be cited in this connection that the test hogs which had hogged down corn and soybeans graded hard or medium hard. The gains made by some of these hogs from the corn field indicate that they ate soybeans and corn in a ratio narrower than 1 to 12.

Mr. Russell:

Are there any questions?

Mr. Salmon:

About what was the finished weight of the hogs that graded soft?

Mr. Vestal:

They were all fairly heavy hogs, about 200 or 225 pounds.

Mr. McDowell:

We are grading the hogs at the Moultrie plant for the farmer to determine if they are hard. We found that we can judge these hogs in the carcass. When we cut up these carcasses we find that our grading in the cooler is practically always correct. We very seldom find any variation. This is the way the packer has to place them. We think that your men Mr. Smith, Mr. Hostetler and Dr. Walter, on this committee know how to judge hogs and that their gradings should determine the quality of the carcass.

Mr. Russell:

Is there any question or suggestion?

Mr. Ferguson:

It seems Mr. Vestal has given us something very valuable. He has brought forth the limits of ratios in which there are safety, outside of which there is danger. I think this is a splendid thing. Is it possible from the feeding standpoint to indicate to the feeder the reasonable limits of ratios?

Mr. Vestal:

We can not give that at this time. With the plans we have definitely under way I believe in a year from now we may be in a position to give at least a preliminary statement as to where we think the danger line is.

Mr. Ferguson:

Once you institute your limits of safety where farmers are feeding soybeans and where you are following a definite proportion of feeds you are going to eliminate about 90 per cent of the danger.

Mr. Russell:

We thought we should go into this work and keep at it until we could say where the danger line is. The following proportions have been tried, 12:1, 9:1, 6:1, 3:1. As Mr. Ferguson said it is certainly a piece of work that is of the highest importance. We intend to follow it until we can state definitely where the dividing line lies.

Mr. Ferguson:

What is the limit of spread you can go and still get good feeding results?

Mr. Vestal:

I would say 1:7 to 1:10. We have had hogs make good gains on 1:16. I rather believe if we have to say you must feed as wide as 1:12 or more then we must supplement that with tankage or something else.

Mr. Ferguson:

As far as you have gone now it looks as if the self feeder system is not safe with the young pigs.

Mr. Vestal:

In 3 years work where we used these young pigs starting about July 1, weighing from 60 to 75 pounds, and fed free choice on corn and soybeans we have found it is not a profitable feeding practice. Older hogs and well grown feeders weighing 100 pounds or more fed up to good market weight consume from 1:7, 1:8 up to 1:16. The soft pork problem would be the question in a case of this kind.

Mr. Russell:

There is another thing which may be of minor importance and it may not be, that is the question of minerals. We are getting reports on mineral mixtures and the matter was discussed, if I remember correctly, last year a little bit. It is a very easy matter if the Indiana Station, the South Carolina Station and the Tennessee Station are running a test of the same kind to agree on a mineral mixture to feed. It may not be very important, on the other hand it may make considerable difference. Would it not be worth while to make a rule if two or more stations are doing the same line of work they should feed the same kind of mineral.

Is there anything further along this line?

Dr. Ellinger:

In discussing soybeans at experiment stations around the corn belt they say that the Purdue station will solve the question on soybeans and minerals. I got this information at the Nebraska, Kansas and Iowa Stations.

Mr. Vestal:

We have been doing work with soybeans and minerals but we are not responsible for that report. We might take a few instances where the mineral mixture does affect the hogs. On the last hogging off experiment we had corn, soybeans and minerals and out of 9 hogs slaughtered we got 8 that were hard and 1 medium hard. Those hogs had made 1.77 pounds gain per day. Other hogs had made 1.03 pounds per day. There is nothing conclusive about it. In the young pigs where a mineral mixture is fed the pigs eat less of soybeans.

Mr. Hostetler:

Mr. Vestal where do you get your wood ashes?

Mr. Vestal:

We get them locally. We have considered buying commercial wood ashes.

Mr. Hostetler:

That is our trouble using wood ashes. We are using practically the same mixture except we are using lime and adding another pound of salt.

Mr. Russell:

Mr. Hankins has a table on the blackboard showing the general summary including grade and refractive index of the lots fed at the Indiana station according to the proportions of corn and soybeans consumed.

	(16.4:1	1.4596)		
	(13 :1 On alfalfa pasture	1.4595)		
	(12 :1 Mix.	1.4601)	33 hard	108 Av. in. wt.
44 hogs	(10.9:1	1.4597)	5 med.h.	132 " gain
	(9 :1 Mix	1.4601)	4 " s.	240 " final wt.
	(8.1:1 On alfalfa pasture	1.4597)	2 soft	
	(8.1:1	1.4595)		1.4598 Ave. R. I.
	(6.25:1	1.4602)		
	(6 :1 Mix.	1.4606)	4 hard	111 ave. in. wt.
	(5.2 :1	1.4605)	10 med. h.	123 " gain
64 hogs	(4.5 :1	1.4602)	21 " s.	234 " final wt.
	(3.7 :1	1.4607)	27 soft	
	(3.3 :1	1.4615)	2 oily	
	(3 :1 Mix.	1.4613)		
				1.4607 Ave. R. I.

Mr. Russell:

In that connection I do not remember whether we discussed yesterday, the question of making some attempt to determine the proportions of beans and corn that hogs consume in hogging down. It seems to me this is a mighty important matter. What is the opinion regarding this?

Mr. Vestal:

I do not think it can be done.

Mr. Templeton:

I do not know whether we can do anything or not. It is going to be a hard thing to find out how much is pastured.

Mr. Russell:

There was another feature involved that I did not mention. At the Indiana station I understand that farmers around there are generally using probably not over 5 or 6 varieties of beans. I talked this matter over with Mr. Morse, who is the soybean man of the Bureau of Plant Industry and we are going to plant at Beltsville at least 4 different varieties of beans to determine if possible the variety they like and consume the most. We will also know the oil content of the beans that have been consumed by the hogs.

Mr. Ellis raised the point last night if it would be possible to get fat samples from hogs killed at some of the commercial plants that were known to be fed corn and soybeans hogged down. It would be valuable as supplemental data. Of course, the packers will do anything that is in their power to help us in any of their plants. Mr. Vestal, do you know of any farmers around there whose hogs would be shipped in a carload lot that would be fed in this manner?

Mr. Vestal:

The committee has in mind getting in touch with as many herds of hogs in Indiana as possible that have been fed soybeans one way or another, and follow them through to the packing plant.

Mr. Russell:

In South Carolina Mr. Starkey, would there be some loads of hogs that you would know something about?

Mr. Starkey:

Most of them are shipped in cooperative shipments.

Mr. Ferguson:

A couple of days ago I went down to see Mr. King of the Indiana Station and I suggested that they pool shipments. The man with 4 hogs or 10 hogs in a place can group them in a car provided the feeding is known. Swift & Company would welcome anything of that kind where shipments would be in easy reach of any Swift & Company plant. The packers will give you samples on your hogs right straight through.

Dr. Jacob:

I think we can get some samples through our local packing plant.

Mr. Cocke:

Mr. Vestal in getting information for practical feeders do you think that the detrimental effect of the soybeans might be overcome by such features as this, feeding smaller hogs with your finishing ones and also keeping tankage before the hogs.

Mr. Vestal:

It would make them less available if the large hogs were in there.

Mr. Russell:

Is there anything further?

I find that some of our men are not going to be with us tomorrow. There was one phase of the work, that of trying to harden peanut fed hogs, that was taken up by the committee last night. I would like to have the committee report, so all the members may discuss it if they choose.

Mr. Hankins:

The committee last night decided it would recommend the issuance of a statement covering the hardening of 100 pound peanut-fed pigs. We did not decide upon the definite wording of that statement as it is to be released. That, in past years, had taken so much time of the committee that we decided we would simply tell the conference the substance of this statement and others which we hope to recommend and get your action. After the meeting the statement will be worded and submitted back to the stations for approval before being released. The substance of the statement pertaining to these 100 pound peanut-fed pigs is simply this:- With pigs started at approximately 100 pounds weight or with a range of from 85 to 114 pounds and fed on peanuts during a feeding period of approximately 8 weeks and making gains of from about 25 to 100 pounds (I am speaking in general terms now) and hardened subsequently on corn with tankage can not be made firm within a practical feeding period. You recall that we fed hogs out to about 350 pounds following such a feeding period on peanuts and did not get any positive results in the way of producing hard hogs. Our recommendation is based on results from 112 hogs. Therefore, we feel justified in releasing a statement of this kind.

Dr. Jacob:

I want to make a motion that the committee report be accepted.

Mr. Vestal:

I second that motion.

Mr. Russell:

I think most of you remember that yesterday in making these reports we reported an experiment of 24 weeks on corn and tankage following 8 weeks on peanuts, 10 head of hogs in which I think 9 of them reported soft and 1 medium hard. I saw these hogs myself and they surely were soft after 24 weeks on corn and tankage. We are conducting some tests now using smaller pigs on peanuts weighing from 40 to 65 pounds. As you gentlemen who have been attending these meetings know the reason for using 100 pound pigs was the fact that through the peanut district usually the hogs are farrowed in March and maybe before that and when they get up to the peanut grazing

period they are up to 85 to 115 pounds radius. That is the reason for taking these weights. Inquiry revealed the fact that 8 weeks was the usual grazing period. That was from a practical standpoint. As you know we have just been unable to harden them. The thought occurred to us that we should make some positive statement. I presume a statement will be made in practical weight or for a practical feeding period.

Is there anything more?

Mr. McDowell:

I want to make the suggestion that when you release this statement instead of stating 100 pound pigs that you give a range of weight because down where I come from the weight of these pigs going into the peanut patch is not 100 pounds. It is nearer 50 than 100 pounds. They do not plant grazing crops for these pigs during the summer period. They just run with hardly any feed.

Mr. Russell:

This statement would cover from 85 to 114 pounds.

Is there any other suggestion?

Mr. Vestal:

I wonder if we might make that just a little stronger by saying that any attempt by the farmer to harden such hogs would prove uneconomical.

Mr. Templeton:

I feel that the statement is well covered. The statement is all right for experiment station men but I just wonder if it would be for the farmer.

Mr. Russell:

I feel that you should make it just as plain as you can make it.

Motion made and seconded that the statement be accepted.

Those favoring the motion, manifest by saying "I". The motion is adopted.

The next will be a report from the Arkansas Station. It was impossible for this station to be represented at this meeting, but they have submitted a report, which I will ask Mr. Hankins to read.

Mr. Hankins:

The report which I will read was prepared by Mr. Martin of the Arkansas Station.

The production of rice in Arkansas is an industry that is steadily growing. More than 99 per cent of the rice produced in the United States is grown in four states- Louisiana, 700,000 acres, Texas, 281,000 acres, Arkansas, 181,400 acres, and California, 162,000 acres.

As in the case of wheat, rice is used almost entirely for human consumption, since only the by-products from the manufacture of polished rice are used for the feeding of farm animals.. Since both rice bran and rice polish produce soft pork, the problem of finding a method of feeding that will produce firm pork is one of considerable economic importance in this state.

Objectives.---The objectives in this experiment were:

1. To find the firmness of pork produced by feeding, rice bran, tankage, and minerals; and rice polish, tankage and minerals.

2. To compare rice bran and rice polish as feeds for fattening swine.

3. When hogs have been fed for eight weeks as described in (1), to find the firmness of pork produced by feeding for eight weeks on brewer's rice, tankage, and minerals, or corn, tankage, and minerals.

4. To compare brewer's rice and corn as feeds for swine.

Plan of the experiment.---For this experiment, 48 63 to 100 pound pigs, averaging 80.4 pounds were used. Before beginning the experiment three of these were shipped to Beltsville to check the firmness of fat.

The remaining 40 pigs were divided into two lots of 24 and 16 pigs each. For a period of eight weeks, the 24 pigs received rice bran, tankage, and minerals while the smaller lot received rice polish, tankage, and minerals.

At the end of the first eight-week period, six pigs from the rice bran lot were shipped to Beltsville to check the firmness of fat. The 18 pigs remaining in this lot were divided into two lots of nine pigs each, one lot receiving brewer's rice, tankage, and minerals and the other corn, tankage, and minerals.

The 16 pigs in the rice-polish lot were divided into two lots of eight pigs each. One of these lots received brewer's rice, tankage, and minerals and the other corn, tankage, and minerals. This part of the trial, known as the hardening period, continued for eight weeks, at the end of which all of the pigs were shipped to Beltsville for slaughter tests.

Feeds used.---The by-products of rice used in this trial were obtained from the Arkansas Rice Growers' Cooperative Association, Stutgart.

The rice bran used was evidently what is known as "commercial bran" or low grade bran, because rice hulls were plainly visible in a sample examined in the laboratory.

According to Feeds and Feeding, "Rice hulls are digested only to a very small extent by farm animals, and furnish only about one-third as much digestible nutrients as wheat straw. They should, therefore, never be fed to farm animals. Yet they have been extensively used by unscrupulous dealers for adulterating mixed feeds."

All of the other feeds used were of standard quality. The chemical analyses which follow will throw some light on the composition of these feeds.

Chemical Analyses of feeds

	Rice polish	Brewers' rice	Rice bran	Tankage
Moisture	9.25	11.40	7.35	8.10
Protein	11.00	7.20	12.20	59.00
Ash	5.65	0.85	13.75	20.25
Fat	12.60	0.55	17.15	9.75
N. F. E.	58.30	79.30	33.35	1.80
Crude fiber	3.20	0.70	16.20	1.10

In this table, it is interesting to note that both the fat and the fiber content of the rice bran and the rice polish are abnormally high.

The corn used in this trial was approximately No. 3 grade as this is the quality that is usually found on our local markets. No chemical tests were made on the corn.

Lots and quarters.---The houses and the lots were uniform for all of the different lots in the experiment. The lots were in blue grass-orchard grass sod. As all of the pigs were well rung and as the experiment did not begin until after several hard frosts, practically speaking, it may be said that the feeding was done in a dry lot.

Animals used.---Inasmuch as the station did not have pigs enough of the right size for this experiment, most of those used were purchased from farmers in the surrounding country.

The pigs used for this experiment were not as uniform as we should have had. The range in quality was from typy Duroc Jersey-Poland China crossbreds grown in our own herds to very short, low set, and fat Duroc Jersey grades purchased from a neighboring farmer.

Vaccination.---All of the animals used in this experiment were given the simultaneous treatment for hog cholera.

Methods of feeding.---All lots were self fed, free choice (cafeteria style) at all times. All of the feeders were inspected at least twice daily, and the feed weigh backs were taken at the end of each 14-day period.

Weighing.---This experiment began on November 14. All of the pigs were weighed on November 13, 14, and 15, and the averages of these three days' weights were taken for the initial weights. The same procedure was followed for closing the first eight-week period as well as for closing the

experiment at the end of the second eight-week period.

Individual weights were taken of all animals at all times.

Feeding during the softening period.---This feeding period began on November 14, 1924, and continued for 56 days. Table I gives a detailed study of the results from feeding the rice bran and the rice polish.

By referring to table I on the following page, it will be noted that the average daily gain in the rice bran lot was 0.51 as compared with 0.88 pounds in the rice polish lot, and that in the former lot it required 644.1 pounds of feed to produce 100 pounds of pork while in the latter it took only 424.6 pounds of feed to produce the same amount of pork. The feed cost for 100 pounds of gain in the two lots were $9.97 and $7.67 respectively.

The following represents the average prices paid for the various feeds used:

Rice bran	$26.00	per	ton
Rice polish	32.00	"	"
Brewer's rice	45.00	"	"
Tankage	85.00	"	"
Corn	1.30	"	bu.
Minerals	1.00	"	100 lbs.

Feeding during the hardening period.--- Table II presents a detailed report of the results of feeding the four lots during the hardening period. It is interesting to note that brewer's rice has the advantage of corn from the standpoint of the feeds required for 100 pounds of gain, the cost of 100 pounds of gain, and the firmness of the pork produced.

Table I: On feeds that produce oily fat.

	Lot I Rice bran	Lot II Rice polish
No. of pigs per lot	24	16
No. of days on experiment	56	56
Average initial weight	84.0	83.1
Average final weight	112.6	132.4
Average daily gain	0.51	0.88
Average daily feed:		
Rice bran	3.01	----
Rice polish	----	3.43
Tankage	0.28	0.29
Minerals	.01	.01
Total	3.30	3.73
Feed per 100 pounds gain:		
Rice bran	587.9	-----
Rice polish	----	389.9
Tankage	54.7	33.5
Minerals	1.5	1.2
Total	644.1	424.6
Cost per 100 pounds gain:		
Rice bran	$7.64	-----
Rice polish	------	$6.24
Tankage	2.32	1.42
Minerals	.01	.01
Total	$9.97	$7.67

Table II: On feeds that produce firm fat.

	Lot I Brewer's rice	Lot II Corn	Lot III Brewer's rice	Lot IV Corn
No. of pigs per lot	9	9	7	8
No. of days on experiment	56	56	56	56
Average initial weight	113.0	115.0	129.3	132.9
Average daily gain	1.74	1.78	1.62	1.68
Average daily feed:				
Brewer's Rice	6.32	---	5.83	---
Shelled corn	----	7.18	----	6.54
Tankage	.31	.50	.19	.38
Minerals	.01	.01	.02	.02
Total	6.64	7.69	6.04	6.94
Feed per 100 pounds gain:				
Brewer's rice	363.0	----	360.5	---
Shelled corn	----	403.0	----	388.5
Tankage	18.0	27.9	11.8	22.9
Minerals	.7	.5	1.0	.9
Total	381.7	431.4	373.3	412.3
Cost per 100 pounds gain:				
Brewer's rice	$8.17	----	$8.11	----
Shelled corn	----	9.36	----	9.02
Tankage	.77	1.19	.50	.97
Minerals	.01	----	.01	.01
Total	$8.95	$10.55	$8.62	$10.00

Table III: Brewer's rice vs corn for fattening swine

	Lot V Brewer's rice	Lot VI Corn
No. of pigs per lot	16	17
No. of days on experiment	56	56
Average initial weight	119.9	123.5
Average final weight	214.6	220.6
Average daily gain	1.69	1.73
Average daily feed:		
Brewer's rice	6.10	---
Shelled corn	----	6.88
Tankage	.26	.44
Minerals	.01	.01
Total	6.37	7.33
Feed per 100 pounds gain:		
Brewer's rice	362.	---
Shelled corn	----	396.4
Tankage	15.4	25.6
Minerals	.8	.7
Total	378.2	422.7
Cost per 100 pounds gain:		
Brewer's rice	$8.14	---
Shelled corn	----	9.20
Tankage	.65	1.09
Minerals	.01	.01
Total	$8.80	$10.30

Brewer's rice vs. corn for fattening swine.---By adding the results secured in the two brewer's rice lots and, in the same way, adding the results secured in the two corn lots, we are able to get a direct comparison of the feeding value of brewer's rice and corn. Table III is presented for the convenience of the reader in comparing these two feeds.

Behavior of animals.---Except for two pigs in the rice polish lot, all of the pigs went through the experiment without any difficulties.

At the end of the first period, two pigs in the rice polish lot were lame. One of these, gilt No. 396, went down completely in the hind parts on the third day of weighing at the beginning of the second period, and was allowed to continue in this feeding period for only three days.

After being taken out of the experiment, this gilt was treated with cod liver oil, and within two weeks she was on her feet again.

The other pig was given no cod liver oil, and it was lame throughout the remainder of the experiment.

Slaughter data.--- The following summarizes the committee grading of the various lots including the checks:

	Hard	Medium hard	Medium soft	Soft
Check	1	---	1	1
Check	---	---	---	6
Lot I	4	1	1	2
Lot II	1	3	4	1
Lot III	1	2	---	4
Lot IV	---	3	3	2

Table IV: Refractive indexes of back fat.

	Hard	Soft	All
Check			
Minimum	------	------	------
Maximum	------	------	------
Average	1.4592	1.4604	1.4599
Check			
Minimum	------	1.4605	1.4605
Maximum	------	1.4618	1.4618
Average	------	1.4612	1.4612
Lot I			
Minimum	1.4590	1.4599	1.4590
Maximum	1.4592	1.4600	1.4600
Average	1.4591	1.4600	1.4594
Lot II			
Minimum	1.4599	1.4606	1.4594
Maximum	1.4599	1.4606	1.4606
Average	1.4599	1.4606	1.4600
Lot III			
Minimum	1.4592	1.4600	1.4592
Maximum	1.4592	1.4600	1.4600
Average	1.4592	1.4600	1.4598
Lot IV			
Minimum	------	1.4602	1.4598
Maximum	------	1.4602	1.4602
Average	------	1.4602	1.4601

The committee grading and the refractive indexes show that the hogs were softer at the end of the first period than they were at the beginning of the experiment (Only the rice bran lot was checked at the end of this period), that there was considerable hardening in all of the lots during the second 56-day period, and that those finished on brewer's rice were somewhat firmer than those finished on corn.

To determine if there is any relation between the weights of the hogs and the hardness of the carcasses, the study presented in table V was made:

Table V: Weights and gains in the various carcass classes.

	Hard	Medium hard	Medium soft	Soft
Number of hogs	6	9	9	9
Initial weights				
Minimum	76.0	66.0	71.0	63.0
Maximum	98.0	95.0	97.0	100.0
Average	88.8	81.6	81.6	84.1
Final weights				
Minimum	207.0	202.0	151.0	155.0
Maximum	249.0	268.0	255.0	288.0
Average	230.3	231.2	202.1	211.7
Total gain, softening (period				
Minimum	28.0	23.0	9.0	16.0
Maximum	45.0	62.0	84.0	85.0
Average	37.8	43.4	33.3	38.1
Total gain, hardening (period				
Minimum	84.0	62.0	64.0	61.0
Maximum	121.0	123.0	117.0	105.0
Average	103.7	106.2	87.2	89.4

Conclusions.---The following is a brief summary of the experiment:

1. Rice bran produces soft pork.

2. Greater gains were obtained from feeding rice polish than from feeding rice bran.

3. As a hardening feed, brewer's rice is superior to corn.

4. More economical gains were secured from feeding brewer's rice than from feeding corn.

Mr. Russell:

Are there any questions? If there is nothing further we will now adjourn for lunch.

Wednesday afternoon

Mr. Russell:

The next on the program will be the Department work at Peoria. We will now hear from Mr. Quesenberry.

Mr. Quesenberry:

Our work at Iberia consisted of feeding rice by-products.

RICE BRAN EIGHT WEEKS FOLLOWED BY SHELLED CORN EIGHT WEEKS
EXPERIMENT NO. 6

Sixteen pure-bred Tamworth pigs weighing at the start of the Experiment 81 pounds were self-fed for 56 days on Rice Bran, Tankage, and Mineral Mixture with 3.14 pounds Skim Milk per head daily hand fed. Three check pigs were killed at the start of the Experiment. They weighed 98, 74, and 44 pounds. These three pigs killed hard. The lot made an average daily gain of 1.07 pounds for the eight week period. The feed consumption per 100-pounds of gain was 420.97 pounds Rice Bran, 14.26 pounds Tankage, 290.50 pounds Skim Milk, and 8.57 pounds of Mineral Mixture. At the end of the eight weeks feeding 1/2 or eight out of the lot were slaughtered. One pig was medium hard, one was medium soft, five were soft, and one was soft and oily.

The remaining 8 pigs were continued on feed for eight additional weeks, and self-fed Shelled Corn, Tankage, and Mineral Mixture, and hand fed 3.14 pounds of Skim Milk per head daily. During this period they gained 1.68 pounds per head daily with a feed consumption of 379.76 pounds Shelled Corn, 5.33 pounds Tankage, 187.48 pounds Skim Milk, and 7.06 pounds of Mineral Mixture per 100-pounds of gain. After eight weeks hardening on Corn we had 3 medium Hard, 4 Hard Hogs, and one Medium soft Hog.

The following tables show how these pigs were fed and gained during the suckling period, from weaning to start of the Experiment, and during the Experimental feeding.

RICE BRAN EIGHT WEEKS FOLLOWED BY SHELLED CORN EIGHT WEEKS
EXPERIMENT NO. 6

PIG NO.	See Note No. 1: SUCKLING PERIOD: DAYS	GAIN POUNDS	See Note No. 2: WEANING TO START OF EXPERIMENT: DAYS	GAIN POUNDS	See Note No. 3: DURING EXPERIMENT: DAYS	GAIN POUNDS	COMMITTEE GRADING	BACK - FAT REFRACTIVE INDEX
			FIRST 56 - DAYS					
1B	70	61.5	44	69.0	56	51.0	MH	1.4599
13S	70	49.0	27	33.0	56	68.0	S	1.4605
14S	70	56.5	27	35.0	56	68.0	MS	1.4601
15S	70	53.5	27	34.0	56	60.0	S	1.4603
21B	70	57.0	23	28.0	56	71.0	S	1.4609
31B	70	45.0	8	7.0	56	48.0	S	1.4611
34B	70	44.0	8	8.0	56	58.0	S	1.4611
36S	70	42.5	8	5.0	56	54.0	S-O	1.4611
AVER.	70	51.1	22	27.0	56	60.0		1.4606
			SECOND 56 days					
2B	70	56.0	44	59.0	56	83.0	MH	1.4595
11B	70	59.5	27	45.0	56	103.0	H	1.4594
20B	70	62.5	23	22.0	56	93.0	MH	1.4595
22S	70	67.0	23	33.0	56	93.0	MH	1.4599
33B	70	50.0	8	6.0	56	101.0	H	1.4594
35S	70	45.5	8	8.0	56	90.0	MS	1.4599
37S	70	37.5	8	6.0	56	98.0	H	1.4596
38S	70	47.5	8	6.0	56	90.0	H	1.4595
AVER.	70	53.2	19	23.0	56	94.0		1.4596
			CHECK PIGS					
12B	70	62.0	27	42.0			H	1.4590
23S	70	59.0	23	26.0			H	1.4588
32B	70	42.5	8	7.0			H	1.4590
AVER.	70	54.5	19	25.0				1.4589

NOTE NO. 1 - FEEDING OF SOWS & PIGS DURING SUCKLING PERIOD: Sows were fed a mixture of Brewer's Rice, Wheat Bran, Wheat Shorts, and Tankage and Skim Milk. Pigs were fed Brewer's Rice, Shelled Corn and Tankage in creep.

NOTE NO. 2 - FEEDING OF PIGS FROM WEANING TO START OF EXPERIMENT: Pigs were fed Brewer's Rice, Skim Milk and Tankage.

NOTE NO. 3 - For first 56 days of Experiment pigs were fed Rice Bran, Skim Milk, Tankage, & Mineral Mixture, after which time eight of the pigs were shipped to Beltsville for slaughter. The remaining eight pigs were fed 56 days longer on shelled corn, skim milk, tankage, and mineral mixture.

RICE BRAN EIGHT WEEKS FOLLOWED BY SHELLED CORN EIGHT WEEKS
EXPERIMENT NO. 6

SUMMARY FIRST 56 DAYS - P. M. Feed Dec. 23, 1924 to A. M.

Feed February 17, 1925 Inclusive:

Number of Hogs in Lot.....	16.
Number of Days in Period...	56.
Initial Weight All Hogs....	1288.00
Final Weight All Hogs.....	2256.00
Initial Weight per Hog.....	81.00
Final Weight per Hog	141.00
Total Gain All Hogs	968.00
Total Gain Per Pig	60.00
Average Daily Gain Per Pig.	1.07

TOTAL FEED CONSUMED:	ALL HOGS	PER HOG
Rice Bran	4075.00	254.69
Tankage	138.00	8.63
Skim Milk	2812.00	175.75
Mineral Mixture....	83.00	5.19

AVERAGE DAILY FEED PER HOG:	
Rice Bran	4.55
Tankage.....	.15
Skim Milk	3.14
Mineral Mixture	.09

FEED EATEN PER CWT. GAIN:	
Rice Bran	420.97
Tankage	14.26
Skim Milk	290.50
Mineral Mixture	8.57

RICE BRAN EIGHT WEEKS FOLLOWED BY SHELLED CORN EIGHT WEEKS
EXPERIMENT NO. 6

SUMMARY SECOND 56 DAYS - P. M. Feed February 17, 1925 to A. M. Feed April 14, 1925, inclusive.

Number of Hogs in Lot	8.
Number of Days in Period	56.
Initial Weight All Hogs	1125.00
Final Weight All Hogs	1876.00
Initial Weight Per Hog	141.00
Final Weight Per Hog	235.00
Total Gain All Hogs	751.00
Total Gain Per Hog	94.00
Average Daily Gain Per Hog	1.68

TOTAL FEED CONSUMED:	ALL HOGS	PER HOG
Shelled Corn	2852.00	356.50
Tankage	40.00	5.00
Skim Milk	1408.00	176.00
Mineral Mixture.	53.00	6.63

AVERAGE DAILY FEED PER HOG:	
Shelled Corn	6.37
Tankage	.09
Skim Milk	3.14
Mineral Mixture	.12

FEED EATEN PER CWT. GAIN:	
Shelled Corn	379.76
Tankage	5.33
Skim Milk	187.48
Mineral Mixture	7.06

Two lots of Pure-bred Tamworth pigs starting at an average weight of 82 pounds were fed during the Summer of 1924. Lot No. 1 was self-fed on Rice Bran, Tankage, and Mineral mixture. Lot No. 2 was self-fed Shelled Corn, Tankage, and Mineral mixture. Both lots received 5 pounds of Skim milk hand fed per head daily.

The Rice Bran lot made an average daily gain of .96 pounds with a feed consumption of 507.38 pounds of Rice Bran, 523.36 pounds Skim Milk, and 12.99 pounds of Mineral mixture. In the Corn lot the average daily gain was 1.45 pounds and the feed required per 100 pounds of gain was 358.10 pounds of Corn, 345.25 pounds Skim Milk, 14.06 pounds Tankage. and 7.40 pounds of Mineral mixture.

All of the hogs were slaughtered after 112 days feeding. In the Rice Bran lot 5 were soft; 1 soft and oily; and 4 medium soft. All the Corn hogs killed hard.

A summary of the feeding and killing data follows.

RICE BRAN AND SHELLED CORN
EXPERIMENT NO. 5

LOT NUMBER	-1-	-2-
Number of Hogs	10.	5.
Number of Days Fed	112.	112.
Initial Weight per Hog	82.0	84.0
Final weight per Hog	189.0	246.0
Average Weight During Experiment	136.0	165.0
Total Gain During Experiment	107.0	162.0
Average Daily Gain Per Hog	.96	1.45
FEED CONSUMED PER HOG:		
Rice Bran	542.90	.....
Shelled Corn	.....	548.40
Skim Milk	560.00	560.00
Tankage	29.00	22.80
Condiment	13.90	12.00
AV. DAILY FEED CONSUMED PER HOG:		
Rice Bran	4.85	.....
Shelled Corn	....	4.90
Skim Milk	5.00	5.00
Tankage	.26	.20
Condiment	.12	.11
AV. DAILY FEED PER CWT. LIVE WEIGHT		
Rice Bran	3.57	.....
Shelled Corn	....	2.97
Skim Milk	3.68	3.03
Tankage	.19	.12
Condiment	.09	.07
FEED CONSUMED PER CWT. GAIN:		
Rice Bran	507.38	.....
Shelled Corn	.....	338.10
Skim Milk	523.36	345.25
Tankage	27.10	14.06
Condiment	12.99	7.40

RICE BRAN AND SHELLED CORN
EXPERIMENT NO. 5

PIG NO.	See Note No. 1: SUCKLING PERIOD DAYS	GAIN POUNDS	See Note No. 2: WEANING TO START OF - EXPERIMENT DAYS	GAIN POUNDS	See Note No. 3: DURING EXPERIMENT DAYS	GAIN POUNDS	COMMITTEE GRADING	BACK - FAT REFRACTIVE INDEX
				L O T - N O. 1				
1B	70	43.5	24	27.0	112	116.0	S	1.4602
4S	70	50.0	24	32.0	112	115.0	S	1.4603
7B	70	52.0	24	31.0	112	105.0	S	1.4604
12B	70	49.5	20	28.0	112	113.0	S	1.4603
13B	70	52.5	20	29.0	112	95.0	S	1.4604
21B	56	52.0	4	0.0	112	98.0	S-O	1.4613
AVER.	68	49.9	19	25.0	112	107.0		1.4605
2B	70	47.0	24	31.0	112	104.0	MS	1.4600
5B	70	50.5	24	35.0	112	109.0	MS	1.4599
11B	70	55.0	20	30.0	112	106.0	MS	1.4603
14B	70	61.0	20	32.0	112	109.0	MS	1.4599
AVER.	70	53.4	22	32.0	112	107.0		1.4600
				L O T - N O. 2				
3B	70	49.5	24	39.0	112	163.0	H	1.4589
6B	70	47.0	24	32.0	112	183.0	H	1.4585
10B	70	58.0	20	31.0	112	162.0	H	1.4590
15S	70	53.5	20	32.0	112	151.0	H	1.4589
20B	56	58.5	4	1.0	112	152.0	H	1.4593
AVER.	67	53.3	18	27.0	112	162.0		1.4589

NOTE NO. 1 - FEEDING OF SOWS AND PIGS DURING SUCKLING PERIOD: Sows were fed a mixture of Brewer's Rice, Wheat Bran, Wheat Shorts, and Tankage, and Skim Milk. Pigs were fed Brewer's Rice in creep.

NOTE NO. 2 - FEEDING OF PIGS FROM WEANING TO BEGINNING OF EXPERIMENT: Pigs were fed Brewer's Rice, Rice Bran, Tankage and Skim Milk.

NOTE NO. 3 - FEEDING OF PIGS DURING EXPERIMENT: Lot No. 1 was fed Rice Bran, Skim Milk and Tankage and a Mineral Mixture. *
Lot No. 2 was fed Shelled Corn, Skim Milk, Tankage and a Mineral Mixture.*

* MINERAL MIXTURE COMPOSED OF:

Charcoal	2 Bus.
Salt	8 Lbs.
Ground Limestone	4 Lbs.
Sulphur	3 Lbs.
Wood Ashes	4 Bus.
Copperas	1 Lb.

The first 56 days feeding results in the Rice bi-product feeding experiment conducted in the Spring of 1924 was discussed at our last meeting. Sixteen out of the 32 hogs had been killed, and the slaughtering data reported.

There remained 12 hogs which were divided into two lots of 6 each. Lot No. 1 was self-fed on Corn and Tankage on Oat Pasture; Lot No. 2 was self- fed on Brewer's Rice and Tankage and on Oat Pasture.

During the 8 weeks feeding Lot No. 1 gained an average of 1.74 pounds daily, and required 409.09 pounds of Corn and 14.41 pounds of Tankage per 100 pounds of gain; while Lot No. 2 gained an average of 2.38 pounds daily, with a feed requirement of 383.63 pounds of Brewer's Rice and 7.88 pounds of Tankage per 100 pounds of gain.

At the end of the eight weeks feeding all hogs were slaughtered and were graded hard. The 6 Corn fed hogs had an average refractive index of 1.4597 (Back fat), while that of the Brewer's Rice hogs was 1.4591.

A summary of the feeding and killing data follows:

RICE POLISH FIRST 8 WEEKS - (SHELLED CORN & BREWER'S) (RICE -- SECOND 8 WEEKS)

SUMMARY OF PIG FEEDING EXPERIMENT NO. 4 - SPRING - 1924

	RESULTS FIRST EIGHT WEEKS	RESULTS - - SECOND EIGHT - - WEEKS	
LOT NUMBER	1	1	2
Number of Hogs	28.0	6.0	6.0
Number of Days Fed	56.0	56.0	56.0
Initial weight per hog	80.30	152.00	150.83
Final weight per hog	145.32	249.17	284.17
Average weight during experiment	112.81	200.59	217.50
Total gain during Experiment	65.02	97.17	133.34
Average daily gain per hog	1.16	1.74	2.38
FEED CONSUMED PER HOG:			
Rice Polish	246.25	.....	.....
Shelled Corn	.....	397.50	.....
Brewer's Rice	.....	.....	511.50
Tankage	17.14	14.00	10.50
Mineral Mixture	6.50	6.17	7.33
AVERAGE DAILY FEED CONSUMED PER HOG:			
Rice Polish	4.40	.....	.....
Shelled Corn	.....	7.10	.....
Brewer's Rice	.....	.....	9.13
Tankage	.31	.25	.19
Mineral Mixture	.12	.11	.13
FEED CONSUMED PER 100 LBS. GAIN:			
Rice Polish	378.70	.....	.....
Shelled Corn	.....	409.09	.....
Brewer's Rice	.....	.....	383.63
Tankage	26.36	14.41	7.88
Mineral Mixture	9.99	6.35	5.50

NOTE: First eight weeks results - P. M. Feed February 1, 1924 to A. M. Feed March 28, 1924 Inclusive.
Second eight weeks results - P. M. Feed March 28, 1924 to A. M. Feed May 23, 1924 Inclusive.

RICE POLISH FIRST 8 WEEKS - (SHELLED CORN & BREWER'S) (RICE -- SECOND 8 WEEKS)

PIG NO.	See Note #1 SUCKLING PERIOD DAYS	GAIN LBS.	See Note #2 WEANING TO START OF EXPERIMENT DAYS	GAIN LBS.	See Note #3 1st 56 DAYS DAYS	GAIN LBS.	See Note #4 2nd 56 DAYS DAYS	GAIN LBS.	COMMITTEE GRADING	BACK - FAT REFRACTIVE INDEX
					L O T - N O. - 1					
16S	70	50.5	58	75	56	75	56	105	H	1.4596
21B	56	39.0	58	47	56	76	56	90	H	1.4599
22B	56	32.0	58	38	56	62	56	95	H	1.4595
27S	56	29.0	58	53	56	67	56	108	H	1.4597
28S	56	38.5	58	32	56	67	56	90	H	1.4598
46S	56	36.5	37	19	56	56	56	95	H	1.4598
AV.	58	37.6	55	44	56	67	56	97	H	1.4597
					L O T - N O. - 2					
1B	70	55.5	58	72	56	78	56	155	H	1.4588
4B	70	41.5	58	62	56	78	56	140	H	1.4589
23B	56	44.0	58	45	56	68	56	140	H	1.4591
32B	56	31.0	37	31	56	51	56	140	H	1.4592
44S	56	32.0	37	17	56	58	56	100	H	1.4595
47B	56	30.0	37	21	56	71	56	125	H	1.4591
AV.	61	39.0	48	41	56	67	56	133	H	1.4591

NOTE NO. 1 - FEEDING OF SOW AND PIGS DURING SUCKLING PERIOD: Sows were fed a mixture of Rice Polish, Wheat Bran, Wheat Shorts, and Tankage. Pigs were self-fed Brewer's Rice, Tankage and Skim Milk in a creep.

NOTE NO. 2 - FEEDING OF PIGS FROM WEANING TO BEGINNING OF EXPERIMENT: Pigs self-fed Brewer's Rice, Shelled Corn, Tankage and Skim Milk.

NOTE NO. 3 - FEEDING OF PIGS DURING EXPERIMENT: For the first 56 days both Lots Nos. 1 and 2 were self-fed Rice Polish and Tankage on Oat Pasture.

NOTE NO. 4 - For the second 56 days Lot No. 1 was self-fed Corn and Tankage on Oat Pasture, and Lot No. 2 was self-fed Brewer's Rice and Tankage on Oat Pasture.

Mr. Russell:

Are there any questions?

Mr. Edwards:

What is the oil content of Brewers' rice?

Mr. Ellis:

It contains from .4 to 1 per cent of oil.

Mr. Russell:

Mr. Hankins, have you a summary of these results?

Mr. Hankins:

We have a summary of data on 32 hogs fed rice bran with tankage, some on pasture and some in dry lot. In every case, of course, rice bran was the basal feed. These 32 hogs have been divided into 2 groups according to initial weight and gains and refractive indexes plotted (chart IX). The 2 groups had average initial weights of 67 pounds and 90 pounds with average final weights of 178 and 199 pounds. We get something here that is different from anything we have seen. This light-weight group started at 67 pounds softened rather rapidly and then became firmer just about as rapidly. The other group was perhaps less abrupt in the softening and hardening. The general results in both groups were about as we have found in connection with rice polish feeding. We believe that that sort of behavior is characteristic of feeds that contain, what we might term medium amounts of fat.

Mr. Russell:

The next will be a report of the work at the Coastal Plain Experiment Station at McNeill, Mississippi. Mr. Greene could not be with us, so I will ask Mr. Hankins to read this report.

Mr. Hankins:

At the Coastal Plain Experiment Station, McNeill, Miss., one lot of 30 head of pigs starting at a weight of approximately 70 pounds per head were fed for a period of 8 weeks on rice polish, marine tankage and mineral mixture self-fed, followed by 8 weeks on corn, marine tankage and mineral mixture self-fed.

Conditions of the Experiment

Part of the pigs were raised at McNeill and part were shipped from Beltsville, Md., arriving at McNeill 24 days before the experiment began. During this 24 days preliminary to the experiment the pigs all of which had

been given the serum-virus immunization treatment for hog cholera before weaning time, were inoculated with hog cholera virus and three temperature readings taken. During this time they were held closely penned in dry lots and all showed some reaction to the inoculation. The pigs were selected for an average weight as near 70 pounds as possible, taking only pigs which had not shown abnormal temperatures two days before.

The handling of the pigs before starting the experiment was unusual in a feeding test and no doubt influenced the gains somewhat during the first part of the period on rice polish. One pig died 24 days after the test began with post mortem evidence of pneumonia. Another pig was unthrifty throughout the rice polish feeding period, making a total gain of 6 lbs. in 56 days. The lots were very dry and dusty having no rain from July 11 to December 8 and this caused considerable lung trouble. The loss of one pig and the unthriftiness of another could in no way be attributed to the feeds used.

Starting at an average weight of 69.5 pounds the pigs made an average gain of 50 pounds per head for the 56 days, closing the rice polish period at a weight of 123.5 pounds per head. The feeds consumed for each 100 pounds gain were: Rice polish 346 lbs., marine tankage 40.4 lbs., mineral mixture 4.34 lbs. Detailed records are given in the summary table.

Assuming from previous results that the pigs were all soft at the end of the rice polish period, no killings were made. Eliminating one pig which was unthrifty, 28 head were changed to corn, marine protein and mineral mixture self-fed for a period of 56 days. The average daily gain during the corn period was 1.54 lbs. the total gain per head being 86.8 lbs. as compared with 50 lbs. for the same length of time on rice polish. The final average weight was 211.9 lbs.

At the conclusion of the feeding period the hogs were shipped to Beltsville, Md., for slaughter and all carcasses graded soft, one only being classed as medium soft. This was somewhat surprising and judging from this one test rice polish would be classed alongside peanuts as a softening feed. Details of the records are given in the summary tables.

Coarse vs. Finely Ground Marine Tankage

For the purpose of the above soft pork work the 28 head of pigs on corn and tankage are grouped together. However, they were actually fed as two lots of 14 head each the only variation being in the form of the marine tankage. A uniform batch of this marine tankage made from fish and shrimp scraps was ground to two different degrees of fineness, one being powdered and the other granular or flaked, the purpose being to determine whether or not there was a difference in the palatability or amounts consumed. The coarsely ground tankage evidently proved more palatable as the lot receiving this form consumed 9.6 pounds more tankage per 100 pounds gain and ate 1.7 pounds less mineral mixture per 100 pounds gain. The average daily gain for both lots was almost identical but the cost of gains in the lot receiving the coarsely ground tankage was 46 cents more per 100 pounds.

Table

Rice Polish Lot, Oct. 15, 1924-Dec. 9, 1924

Initial total weight (30 head)	2084.6 lbs.
Initial average weight	69.5 "
Final total weight	3584.0 "
Final average weight	123.5 "
Average total gain (56 days)	50.0 "
Average daily gain	.964 "

TOTAL FEEDS CONSUMED

Rice polish	5420.0 lbs.
Marine tankage (50% protein)	643.0 "
Mineral mixture (Equal parts salt, acid phosphate and bone meal)	68.0 "

FEED PER HEAD DAILY

Rice polish	3.34 lbs.
Marine tankage	.39 "
Mineral mixture	.04 "

FEED CONSUMED PER 100 POUNDS GAIN

Rice polish	346.0 lbs.
Marine tankage	40.4 "
Mineral mixture	4.34 "
Total	390.74

FEED COST PER 100 POUNDS GAIN

Rice polish at $44 per ton	$7.61
Marine tankage at $70 per ton	1.41
Mineral mixture at 1.6¢ per pound	.07
	$9.09

SUMMARY TABLE

Corn, marine tankage and mineral mixture, self-fed 8 weeks following Rice polish, marine tankage and mineral mixture self-fed 8 weeks.
28 head from December 10th 1924 to February 3, 1925 - 56 days

. . . . . .

WEIGHTS AND GAINS

Initial total weight	3504.0 lbs.
Initial average weight	125.1 "
Final total weight	5934.0 "
Final average weight	211.9 "
Average total gain	86.8 "
Average daily gain	

TOTAL FEEDS CONSUMED

Corn	10034.0 lbs.
Marine tankage	1024.0 "
Mineral mixture	144.0 "

FEED PER HEAD DAILY

Corn	6.4 lbs.
Marine tankage	.65 "
Mineral mixture	.08 "

FEED CONSUMED PER 100 POUNDS GAIN

Corn	412.9 lbs.
Marine tankage	42.1 "
Mineral mixture	5.9 "
Total	460.90

FEED COST PER 100 POUNDS GAIN

Corn at $1.50 per bushel	$11.06
Marine tankage at $70 per ton	1.47
Mineral mixture at 1.6¢ per pound	.09
	$12.62

SUMMARY TABLE

Corn, Marine Tankage and Mineral Mixture Self-fed 8 Weeks.
Lot 1- Marine Tankage Finely Ground, Lot 2- Coarsely Ground

. . . . . .

WEIGHTS AND GAINS	Lot 1	Lot 2
Initial total weight	1755.0 lbs.	1749.0 lbs.
Initial average weight	125.3 "	124.9 "
Final total weight	2990.0 "	2944.0 "
Final average weight	213.5 "	210.2 "
Average total gain	88.2 "	85.3 "
Average daily gain	1.57 "	1.53 "
TOTAL FEEDS CONSUMED		
Corn	5059.0 lbs.	4975.0 lbs.
Marine tankage	462.0 "	562.0 "
Mineral mixture	84.0 "	60.0 "
FEED PER HEAD DAILY		
Corn	6.45 lbs.	6.34 lbs.
Marine tankage	.58 "	.71 "
Mineral mixture	.10 "	.07 "
FEED CONSUMED PER 100 POUNDS GAIN		
Corn	409.0 lbs.	416.0 lbs.
Marine tankage	37.4 "	47.0 "
Mineral mixture	6.7 "	5.0 "
Total	453.10	468.00
FEED COST PER 100 POUNDS GAIN		
Corn at $1.50 per bushel	$10.96	$11.14
Marine tankage at $70 per ton	1.33	1.64
Mineral mixture at 1.6¢ per pound	.11	.08
	$12.40	$12.86

Mr. Hankins:

These pigs, you will recall, averaged just about 70 pounds initial weight and gained approximately 1 pound a day on rice polish and tankage. There was very little difference in the average gains of the two lots on the hardening period, 88 pounds in one lot and 85 pounds in the other, with an average daily gain of 1.57 on one lot and 1.53 in the other. The average refractive index in both lots was 1.4602. The ratio of gains on the softening feed as compared to the hardening feed in one case was 1:1.6 and in the other 1:1.5.

Mr. Russell:

Are there any questions?

Mr. Hankins:

I have a summary of the rice polish hardening work. (chart X). This is a summary of data from 51 hogs. As the chart shows, they were divided into 2 groups (1) initial weights under 70 pounds, (2) initial weights 70 pounds and over. Each group was sub-divided according to gains on rice polish. The table below gives the substance of the results.

Initial weights under 70 pounds (average 58 pounds)

35 pounds gain rice polish	78 pounds gain corn necessary to attain 1.4601.5	1:2.1 ratio
67 " " " "	61 pounds gain corn necessary to attain 1.4601.5	1:1.1 "

Initial weights 70 pounds and over (average 80 pounds)

38 pounds gain rice polish	81 pounds gain corn necessary to attain 1.4601.5	1:2.1 "
67 " " " "	81 " gain corn necessary to attain 1.4601.5	1:1.2 "

From the group of 51 there were 18 graded hard or medium hard. The average weights of the 18 was 72 pounds, gain on rice polish 50 pounds and gain on corn 110 pounds, making the gain ratio 1:2.2. The average refractive index was 1.4597.5.

Mr. Russell:

Our next reports will be on some work at Beltsville and North Carolina on what we have called a heredity test. You will recall I told you about our plan, at the Knoxville meeting last year. For the benefit of those who were not at that meeting I will briefly state the plan. At weaning time, sow pigs were placed on pasture, when available and kept on pasture as much of the time as possible, and given peanuts and middlings in self feeders, free choice until they farrow. We know that if they were

slaughtered the carcasses would be oily. At farrowing time the feeds were changed and during the suckling period the sows and pigs received hardening feeds. No softening feeds of any kind were fed to the pigs from weaning until slaughter - in other words,- they were grown and fattened on corn, tankage and middlings. Mr. Hostetler observed this test at Beltsville and used one sow in much the same way, the results of which he will give you. Let me say that we would be pleased to have any of you gentlemen do some of the same work at your station, that additional data may be procured.

Mr. Hostetler:

I might say the reason we undertook this work at the North Carolina station was because they were doing it in Washington and they slipped some of these pigs on us at the grading committee meeting one time. I was one who graded the pigs soft and I told Mr. Hankins I did not believe it in spite of the fact that it was so on the card. I picked out one of the sows we had and shipped the pigs to Washington when we got through. This sow was a purebred Duroc sow. She weighed between 450 and 500 pounds when the experiment started on May 31 last year. On June 13 she was bred and farrowed 8 pigs on October 5 and was weaned on December 1. She only weaned 4 of the 8 pigs. Three died early during the suckling period and the other just before they were weaned. We are continuing this sow on the feed. Before she farrowed she consumed 537 pounds peanuts, 55 pounds fish meal, 20 pounds mineral. In addition to this feed she was on whatever grazing was available. As soon as she farrowed we changed her ration to a ration of corn meal, ground oats, shorts, alfalfa meal, fish meal and linseed meal. During suckling period she consumed 660 pounds of this feed.

The pigs ate with the sow when they cared to and in addition they received 53 pounds of shelled corn in a creep during the suckling period. The pigs were weaned on December 1 and given the worm treatment and started on experiment on December 3. They were fed together for a while. They were divided into two lots and fed individually. Two of the pigs were fed shelled corn 60 parts, shorts 30 parts and linseed meal 30 parts. The average daily gain was a little less than .9 of a pound for the period. The total feed consumed by three of the pigs was very uniform. By 2 pigs it was exactly 400 pounds. One of the rice pigs 399.7 and the other rice pig 379.1. These pigs were killed and graded last week. From the 2 corn pigs one killed medium soft and the other soft. The refractive index on the medium soft hog was 1.4603 and the soft hog 1.4605. It should have been in the medium soft class. It was graded by the committee soft. The brewers' rice pigs were both graded hard by the committee with the same refractive index 1.4592, which would indicate they were well over on the hard side. There is another thing about this experiment and I am sorry we did not hold these pigs over another 28 day period. It would make about 5-1/2 months instead of 4-1/2. The lowest final weight was 142 pounds and the highest 166 pounds. We are continuing this sow and we plan to continue and carry the pigs to a little heavier weight.

Mr. Russell:

Mr. Hankins, will you take up our part of it?

Mr. Hankins:

We have other animals to report on from this same line of work. The dams were fed peanuts, middlings and mineral mixture from the time the dams were weaned until the pigs were farrowed. At that time the sows were changed over to a ration of corn, middlings and tankage. They were so fed throughout the suckling period. These pigs were fed corn, middlings and tankage throughout their lives.

No.	Final Wt.	Average daily gain (Birth to final wt.)	Grading	Refractive index
48.6	237	.93	medium-hard	1.4596
49.4	205	.77	hard	1.4588
109.2*	198	1.19	medium-soft	1.4601
109.4*	198	1.08	medium-hard	1.4593
126.1	203	1.08	soft	1.4605
109.1*	208	.93	soft	1.4598
109.7*	190	.85	medium-soft	1.4598

*Litter mates.

Last year we reported on twelve pigs handled in this same way and they were all soft. Here we have some that are hard and medium hard and others soft. Undoubtedly this work should be continued.

Mr. Russell:

I might tell you about a little work we have carried on at Beltsville. A part of it we have not had time to summarize. For the past two years during the gestation period we divided our sows that farrowed spring litters into two bunches, one bunch of these sows was in a field where we had the soybeans test. The sows were left in here until they farrowed. We have no idea how many of the beans they got. In addition they had middlings in a self-feeder and had to go a long ways to get it. They had alfalfa hay free choice but did not eat any. The other lot was fed just the same only they had tankage. We had two ideas in mind, whether or not the feeding of these soybeans during gestation would have any influence on the quality of pork produced and the other was whether there is a real value in animal protein during gestation. The results have not been summarized. Many of these pigs were in identically the same lots and the slaughter records will be made as far as chemical and physical grades are concerned and possibly we may see something.

This concludes the reports on the feeding of the hogs at the various stations.

Mr. Edwards:

Is there any reason to believe that so many young hogs are soft due to the fat in the milk or is it due to some other reason?

Mr. Anderson:

I was wondering if any work had been done along that line.

Mr. Hankins:

We think that is explained in the bulletin.

Mr. Anderson:

My guess would be that the characteristics of the oil in the fat would be transmitted the same in the milk of the sow as in the case of the cow.

Mr. DuRant:

What is the difference in price between corn and brewers' rice?

Mr. Quesenberry:

Just at present brewers' rice is selling at about $50.00 a ton.

Mr. Russell:

Apparently we have something of a hardening feed in brewers' rice. As you know the Institute of American Meat Packers are a party to our work and are represented at this meeting by Mr. Anderson of Yale. Mr. Anderson is conducting some work using small animals along the line of fat formation and its relation to the soft-pork problem. We will be glad to have Mr. Anderson give us the results of this work at this time.

Mr. Anderson:

Last year we reported the beginning of a series of feeding experiments relating to fat production in which the dietary features were so selected that all the now recognized essentials for nutrients were provided and that decided variations in the ration could be initiated with respect to some one nutrient without markedly altering the other indispensable food factors. The studies were made on albino rats for well established reasons that need not be reviewed here.

It was soon observed that when the rations were kept comparable with respect to the total energy, protein, inorganic salts and vitamin makeup. the resulting body fat showed wide variations in character depending on the nature of the other fat-forming precursors in the diet. This emphasized in a most striking manner the dominant role that feed may play in fat production. For example, when 60 per cent of the energy in the food was supplied by fat, the body fat similated the ingested fat in its characteristics.

On the other hand, we have found that when carbohydrate in the form of starch furnishes the preponderance of the energy intake, an entirely different characteristic fat is deposited, namely, a harder fat. Furthermore,

when the diet of rats raised to 140 grams is changed from one containing peanut oil, cottonseed oil, or soybean oil to this diet rich in carbohydrate, mature animals produce fat which compares closely in texture with the fat obtained from individuals fed on the diet high in carbohydrate.

More recently the influence of high concentrations of protein, instead of fats and carbohydrate, in the diet has been studied. The fat obtained thereby is characterized by an iodine number value closely approximating that of fat produced on a diet high in carbohydrate. The striking superficial resemblance between fat formed on the high starch diets and the high protein diets is in harmony with the physiologically justified presumption that the immediate fat-producing material in either case is glucose formed from starch on the one hand and the amino acids of the protein on the other.

In order to determine whether there is any difference in quality of fat formed from different dietary carbohydrates, the results of feeding starch, dextrin, and dextri-maltose respectively, have been compared. The fats obtained from all three carbohydrates have been practically the same.

In still other experiments which have been performed we have found that relatively small amounts of fat in the diet sufficed to influence the quality of fat produced in the animal. Looked at from another viewpoint it required comparatively large amounts of starch to dilute the effects of the ingested fat. In these particular experiments instead of supplying 60 per cent of the energy with fat, 30 per cent was supplied thereby and 30 per cent by starch, while in still other feeding tests 45 per cent of the energy was supplied by starch and only 15 per cent by fat. Not until the latter low level of fat was fed was there an appreciable fall in the iodine number value.

Having shown the striking influence exerted somewhat specifically by carbohydrates and various individual types of fat upon body fat of the rat it seemed worth while to ascertain the effects of characteristic hog fattening rations upon the fat production of the species -- the rat -- from which our scientific data have been obtained. Accordingly we have fed two different hog rations having the following percentage composition:

Ration 1	Per cent	Ration 2	Per cent
Yellow corn	75	Yellow corn	81
Tankage	10	Tankage	9
Middlings	13	Linseed Meal	5
Sodium chloride	2	Chopped alfalfa	5

The outcome of such studies should demonstrate to what extent comparisons between two omnivorous species are warranted -- a feature that is important before the various forms of laboratory feeding experiments are investigated in a tentative way under conditions of agricultural practice.

Having found the wide variations in quality of body fat, as judged by iodine number and refractive index values, produced from different ingested fats and carbohydrate, we plan to concentrate our immediate attention upon the determination of the fatty acid components. Detailed knowledge derived from such a procedure, we believe, will be of the most valuable nature in an attempt to determine the influence of diet upon the quality of fat produced in the animal body.

Mr. Russell:

Are there any questions?

Mr. Hankins:

At what weight did these rats go on the oil ration?

Mr. Anderson:

All the animals are started at 30 days of age at 50 grams weight.

Mr. Ellis:

What part of the rat do you use?

Mr. Anderson:

We use the whole rat except the intestinal tract.

Mr. Russell:

We will now have Mr. Ellis' report, whom you know is conducting the chemical side of our work.

Mr. Ellis:

The purpose of this report is to point out and briefly discuss the lines of work being pursued in the laboratory studies at Beltsville on the soft pork problem.

From the beginning of the laboratory work on soft pork in 1920 until June 1924, the work was conducted in the laboratories of the Dairy Bureau at Beltsville. Last June we moved to a new laboratory belonging to the Animal Husbandry Division and also located at Beltsville. There has also been a change in personnel during the year. Mr. Isbell resigned January 1, 1925 and was succeeded by Mr. Dahl in February of this year.

A number of phases of the work started several years ago in some cases, have been completed and where desirable are being prepared for publication. Results on other projects more recently started and still incomplete can only be given in part. The new lines of work will be mentioned in brief form.

The routine examination of the fat samples from the hogs in the soft pork experiments has continued along the lines of that pursued in previous years. The refractive index has been determined on all samples while other constants such as iodine number and melting point have been determined on a smaller number of samples chosen from special study. The usual procedure of checking the committee gradings and the refractive index at the time of grading has been followed.

A paper was presented at the Baltimore meeting of the American Chemical Society held early in April. The title and abstract of the paper follow:

"Soft Pork Studies: Formation of Fat in the Pig on a Ration Moderately Low in Fat. N. R. Ellis and O. G. Hankins.
(From Nutrition Laboratory and Swine Office, Animal Husbandry Division, Bureau of Animal Industry, U. S. D. A.)

In connection with cooperative soft pork studies conducted by the Department of Agriculture and a number of State experiment stations, a quantitative study was made of the progressive hardening of pigs on a ration of corn and protein supplement.

From pigs slaughtered at various stages of development determinations were made of the amounts of fat consumed and the quantity and composition of the fat deposited. Fat formed and deposited by an animal is usually hard. Ingested fat tends to be deposited with but slight modification of its characteristics. An increase in hardness in these experiments was accompanied by an increased rate of deposition. The soft fat of the corn had less and less diluting effect on the harder synthesized fat. The saturated acids of the lard increased, the oleic acid remained constant, and the linolic acid decreased."

The paper was given as a joint contribution of the cooperating agencies, the stations participating along with the department being named.

The work was reviewed at the Knoxville meeting and the more important data were incorporated in the report of last year's conference. In order to recall it to your minds and to point out certain features that possibly were not emphasized last year I will describe the experiment and then show you the results in graphic form.

You will recall that section A of the conclusive results given in the bulletin which we have been preparing for publication, deals with the progressive hardening of pigs on a ration of corn with non-softening supplements. In connection with the progressive hardening, the relation of immaturity and softness in 100 pound pigs was discussed. The experiment under discussion was designed to secure more exact and convincing proof of the above than could be secured from a compilation of general data from check pigs and control lots on corn with supplements. The experiment brought out very convincingly the fact of the progressive hardening under the conditions given. Part B of the experiment was incorporated into the section A referred to above. There were two parts to the experiment. In trial A, the

ration fed was corn and skimmilk, while in trial B it was corn and tankage with the addition of alfalfa meal to a number of pigs. In each part of the experiment feed consumption records were kept. Pigs were slaughtered periodically at six stages of growth, from 15 pound size to 225 pound size. They were graded and then cut up for analysis. The total moisture, protein, fat and ash were determined as well as the composition of the fat. Not only were fat constants determined but the percentage of saturated, oleic and linolic acids as well. A total of 46 pigs were analyzed.

The results as shown in the charts are averages of each stage in each feeding test.

1. Chart 1 shows the percentage composition based on analyzed weight. The feature of interest is the rise in fat percentage in trial A from 11.29 per cent, the low point at the weaning stage, to 41.78 per cent at the last or finished stage. The pigs in trial B were slightly fatter throughout the experiment. A drop in the per cent of moisture followed the rise in fat per cent.

2. Chart II shows the refractive index and the iodine number. Both show a very marked decrease with increasing size. In terms of committee grading the change was from soft to hard. This progressive hardening of pigs on rations such as used here is the outstanding feature of the experiment. The same thing is brought out in certain of the charts to follow.

Chart III shows the per cent of fatty acids in the body fat. The oleic acid remained almost constant, the small fluctuations bearing little relationship to the fat as a whole. There was, however, an increase in the per cent of saturated acids and a corresponding decrease in the linolic acid with increasing size of the animals. This explains the drop in the fat constants shown in Chart II.

Chart IV shows the increasing rate of fat storage with increase in size. From a very low rate of less than 20 per cent up to weaning, there was an increase up to 60 to 65 per cent when the pigs passed the 200 pound mark. In other words, the fat constituted practically two-thirds of the gain in weight at the latter stage.

In Chart V, the relationship between the amounts of feed fat and body fat are given. The ingested fat was calculated from the total feed consumption. There was added to this an estimated amount of fat in the dam's milk. During early growth the ingested fat is nearly sufficient to account for the total body fat. Then the ratio widens very perceptibly so that at the last stage the ingested fat constituted only about one-third of the body fat. The other two-thirds were necessarily derived from the carbohydrate and protein of the ration.

In Chart VI, the fatty acids of the body fat and ingested fat are given. They are based on the amounts formed or ingested from weaning. The point of interest here is the behavior of the linolic acid. Unlike the other fractions, the amount of this constituent in the feed was in excess

of that in the body at all times. This suggests that it may be the factor (if any one factor can be chosen) in controlling the progressive hardening.

These results are thought to offer a satisfactory explanation of the progressive hardening of hogs on a ration containing a moderately low amount of softening fats.

Mr. Isbell wrote of the special problems on which he worked and we expect to prepare certain of them for publication. Some of the data was obtained previous to his connection with the laboratory but he incorporated this along with his results. Abstracts of these reports will be given in this report as follows:

A. Introduction and Methods.- Notes on methods employed in analysis of fat, including modifications of standard methods. Methods covered are the various fat constants and the lead salt-ether method of separating saturated and unsaturated acids together with distillation of methyl esters of the saturated acids.

B. The variation in the composition of lard with the ration of the hog.- Samples of lard chosen as representative of the various feeds and feed combinations used in the soft pork experiments. The samples were usually composites of the fat of several hogs. The analyses run were

Saponification No.	Per cent unsaturated acids
Iodine "	" " oleic acid
Specific gravity	" " linolic "
Refractive index	" " linolenic "
Melting point	" " cluhanodonic "
Per cent insoluble acids	Titer test
" " saturated acids	

The following are the groups (by feeds) and the number of samples studied in each group.

1. Corn and supplements 4 samples
2. Brewers' rice and supplements 3 samples
3. (1) Rice polish (2) hardening on corn and (3) on brewers' rice 3 samples
4. Peanuts alone 8 samples
5. Peanuts alone followed by corn and supplements N. Carolina hogs 5 samples
6. Peanuts alone followed by corn and supplements Beltsville hogs 5 samples
7. Soybeans alone 4 samples
8. " " followed by corn with supplement 5 samples
9. Effects of added oils (corn, soybean, peanut, cottonseed) 8 samples
10. Comparison back fat versus leaf fat 4 samples
11. Miscellaneous samples (chufas, peanut meal, rice polish) 3 samples

Summary of results.

1. The softness of the lard is closely associated with the softness and the amount of the oil in the feed.

2. The fatty acids in lard from hogs fed peanuts, soybeans, chufas, and high amounts (14 per cent) of corn oil occur in proportions similar to that in the plant oil.

3. Linolenic acid from soybeans, and arachidic acid from peanuts have been isolated in the lard but not to the extent they occur in the plant oil.

4. Very little linolic acid is found in lard from hogs fed brewers' rice. Taken with other data, the information indicates that the amount of this acid in the lard depends upon the amount in the feed.

5. Hardening with corn or brewers' rice following softening on peanuts, soybeans, and rice polish is accompanying by an increase in the saturated acids and a decrease in the linolic acid, the change being more marked on brewers' rice.

C. Composition of lard (complete separation of the fatty acids). Six samples of lard from hogs fed on rations with wide variations in the fat content were completely analyzed.

The per cent of fatty acids expressed as glyceride was

Glyceride of		Brewers' rice	Corn	Peanuts (1)	Peanuts (2)	Soybeans (1)	Soybeans (2)
Oleic	acid	58.37	54.26	64.58	56.70	40.42	29.79
Linolic	"	1.22	7.06	19.69	19.48	31.92	38.26
Linolenic	"	----	----	----	----	0.02*	0.53
Clupanodonic	"	0.02	0.06	0.05	0.12	0.08	0.05
Myristic	"	1.75	0.65	0.10	0.44	0.76	0.30
Palmitic	"	26.50	25.22	10.35	15.54	17.41	14.50
Stearic	"	12.15	12.78	4.91	7.46	9.36	7.95
Arachidic	"	----	----	0.25	0.22	----	----

Summary

1. The peanut and soybean lards resemble that of the corresponding oils.

2. The amount of palmitic acid is approximately twice that of stearic in all cases.

3. The brewers' rice lard is representative of that made from carbohydrate.

*Low recovery.

D. The occurrence of an acid forming an insoluble bromide in lard. An acid forming an octobromide has been found and the amount determined in most of the samples upon which fatty acid separations were made. The amount found varies from 0.024 per cent to 0.309 per cent of the lard. The feeding of fish meal appears to cause an increase in the amount of the acid. It occurs in lards where there is no history of fishmeal feeding. The acid appears to belong to the clupanodonic series.

E. The saponification value of the saturated acids from lard. It was found that the saponification value of the saturated acids from lard has a more nearly constant value than the other so-called fat constants. With the exception of three questionable samples, the range of 34 samples was; minimum 210.6 and maximum 214.0. It is possible that the feeding of lower saturated acids such as coconut fat would change the value more than the feeds considered.

F. The mean molecular weight of fatty acids. The neutralization value and saponification value for the determination of the mean molecular weight were compared. It was found that the saponification value for fatty acids of lard is closer to the theoretical than the neutralization number. The former runs slightly higher and the latter lower.

Another experiment we ran last year was a study of the composision, in terms of the total carcass and the fat, of pigs started on peanuts at 100 pounds, fed for 60 pounds or peanut gain and then fed corn and tankage for multiples of this 60 pound peanut gain.

Pigs were analyzed which represented the various stages, namely: 3 pigs at 100 pounds, 3 pigs at 160 pounds, one with 120 pounds of corn gain, 2 with 150 pounds, 1 with 180 pounds, 2 with 210 pounds and 1 with 240 pounds.

It was found that the average rate of fat storage on peanuts was the same as that on corn and tankage. The rate in round numbers was 60 per cent. A study of the per cent of fat in the animals and the composition of the fat in connection with the feeding history shows some close relationship. Differences in the firmness of pigs which have similar gains on the softening feed and also on the hardening feed may usually be due to differences in the amount of fat present.

Since the fat laid down during corn and tankage feeding following peanuts is similar to that formed after the pig passes the 100 pound size when not preceded by peanuts, the result in the case of the peanut-corn feeding is a mixture of the two fats namely the "peanut" and the "corn". The great difficulties of producing hard hogs when started on experiment at 100 pounds, fed peanuts for 8 weeks, and then fed corn and tankage has been fully discussed at this meeting. Using the analytical data of the experiment just discussed a table has been prepared illustrating the hardening effects of corn and also of brewers' rice. The firmness is given in terms of the refractive index. The values in the case of the corn group are largely backed up by actual figures while in the case of the brewers' rice group are largely calculated.

Size of pig at start of feeding 100 pounds
Gain on peanuts 60 "
" " hardening feed p multiples (1, 2, 3 etc) of peanut gain.
Refractive index of fat in 100 pound pigs 1.4602
" " " peanut fat 1.4630
" " " corn " 1.4593
" " " brewers' rice 1.4582

Ratio Peanut hardening feed	Final weight of hog	Refractive Index Corn	Refractive Index Brewers' rice
1:1	220	1.4612	1.4606
1:2	280	1.4605	1.4598
1:3	340	1.4602	1.4594
1:4	400	1.4600	1.4592
1:5	460	1.4599	1.4590
1:6	520	1.4598	1.4589
1:7	580	1.4597	1.4588
1:8	640	1.4597	1.4587

It will be noticed that after reaching the weight of 400 pounds the rate of hardening on corn is very slow and hard hogs (1.4597) are not produced until past 600 pounds. In the case of brewers' rice, hardening is much more abrupt during the earlier stages; although the figures indicate that a weight of 300 pounds must be obtained to produce hard hogs.

At the present time we are doing some work on pigs started on peanuts at 40 pounds similar to that done on the 100-pound starting weight. Incidentally in the latter group we are analyzing an additional hog which made a gain on corn and tankage of over 5 times that on peanuts. It is as yet impossible to say whether the rate of fat formation on peanuts between weights of 40 and 100 pounds is as rapid as that over 100 pounds. If it is not as rapid, the hardening process should be easier.

Following is a brief outline of the new work planned or under way.

1. Continuation of studies on pigs started on peanuts at 40-pound size.

2. Fat formation on brewers' rice. Two sows were fed brewers' rice, blood meal and alfalfa meal during the gestation period. They farrowed early in April and are being continued on the same feed during the suckling period. The pigs will receive the same feed after weaning. They will be fed individually and the experiment conducted similar to the one in which the progressive hardening on corn was studied.

3. Fat metabolism in blood, liver and other parts of body,- involving study of composition of fat in these parts when animals are on widely different feeds.

4. Comparison of fat formation in different species - sheep, poultry etc.

5. Keeping qualities of hard and soft lards as well as cooking qualities of meats.

6. Continuation of fatty acid separation on feed combinations where new data of value may be obtained.

7. Small animal (rat) feeding work to supplement pig feeding work.

8. Continuation of routine testing of fat samples of hogs used in cooperative experiments.

Mr. Russell:

We will now take up the question of the bulletin. Have any of you any suggestions to make after reading all or part of the proposed bulletin?

I think I said yesterday that a precedent in this bulletin is being set. I can not help but think that if we put this bulletin out in good shape, the time is not so far distant when other bulletins giving the results of cooperative work will be published.

Mr. Templeton:

I do not want to rush this matter, but I think that the station men have had an opportunity to look this matter over pretty carefully and are very much pleased with it. It seems to me that the material is comprehensive and put up in fine shape. I would make a motion that we approve the manuscript as it is.

Mr. Hostetler:

I second the motion.

Mr. Hankins:

I would like to make one request. We were as careful as we could be in writing this material to give every station all credit that was due for the work done. Naturally we have had to make innumerable references to the various stations. It is not only possible but quite probable that we have failed in some places to make proper mention. If any of you men have found any place at all where we have failed to give proper credit, we hope you will not hesitate to speak up and tell us about it.

Mr. Salmon:

It seems to me that there are two or three things in here that might well be discussed. One thing I would like to bring out here is on pages 6 and 14. On page 6 it states, "In view of the above-mentioned facts and of the great economic importance of the problem of hog growers and others,

research by the department was considered highly desirable. Thus it was that on July 1, 1919, the U. S. Department of Agriculture, Bureau of Animal Industry, with the cooperating agencies began studying the questions involved in this problem." On page 14 is a similar paragraph which seems unnecessary as the plan has already been discussed.

Mr. Hankins:

The first paragraph on page 6 is a development from the last sentence on page 5 which said "Although some important results had been obtained it had become evident that complete solution, at least from the viewpoint of American interests, was far distant under the independent, unorganized method of study." Then it seemed logical to mention that the Department and cooperating agencies came together and started this work. That was really the thought back of the statement on page 6. On page 14 the cooperative plan of investigation is explained in detail.

Mr. Russell:

I have a suggestion which I think would settle this satisfactorily. Call attention of our Editorial office to these 2 pages and see what they think about it.

Mr. Salmon:

On page 16 near the bottom of the page, "It is considered best to hold the cooler temperature between 34 and 35 F. for the 12 hours or more immediately preceding the grading of the carcasses by the committee."

The cooler temperature was kept at 34 to 35 degrees for 12 hours would be preferable.

Mr. Russell:

I might explain that we have a box that only holds 75 hogs. These warm hogs bring the temperature up quite rapidly when they first go in and it takes some time to get it back to the right point.

Mr. Hostetler:

The thought occurred to me that on page 6, what would be the objection to having it read. "Thus it was that on July 1, 1919 the cooperating agencies began studying the questions involved in this problem. On page 14 it explains these agencies.

Mr. Edwards:

Along in the beginning of the bulletin, it seems to give the impression that soft pork is universally accepted as an inferior product. Perhaps future experiments may show it to be as good or better than firm pork.

Mr. Russell:

We have to state facts as they are at the present time.

Mr. Edwards:

You could leave it open and not be specific in that line.

Mr. Vestal:

Regardless of whether the soft pork is a poor product or not.

Mr. Hankins:

We have no experimental data but we have irrefutable statements and pictures to show the inferiority.

Mr. McDowell:

The packers who handle this soft pork are maintaining it is just as good a product to eat as any other pork product but we all know in the utilization of this meat through packing houses the packer loses a lot of money. He has to sell it cheaper. We have to sell it cheaper because it does not look as good as the hard meat.

Mr. Edwards:

I believe it is possible to word it to leave out the statement "a low quality product," and convey the fact that when the investigations were started the farmers were getting a lower price for soft pork than for firm pork.

Mr. Hostetler:

I thoroughly agree with you gentlemen who are anxious to make these sound as good as possible. It looks to me like we would look like a cheap bunch if we would infer that soft pork is as good as firm pork. It would seem like we had been barking up the wrong tree all the time. To me there is certainly sound reason for carrying on this project. Packing houses have created these differences between soft and hard pork and possibly they made a mistake. Sometimes I think they did. There is some reason for this condition.

Mr. Edwards:

I think if the statement were put out that the farmers were getting 1 or 2 cents a pound less for soft pork it justifies all the work that has been done.

Mr. Russell:

That is stated in the manuscript.

Mr. McDowell:

I just suggest that you say it is of lower commercial value than hard pork and not say it is an inferior product.

Mr. Russell:

I think in the last 5 or 6 years that the packers have found better methods of handling this soft pork. The fact still exists that if everybody could have hard pork they would want it.

Mr. Salmon:

It seems to me it would be smoother to start with the second sentence, and not use the first sentence.

Mr. Russell:

Are there any other suggestions regarding this particular sentence or other ideas on the bulletin?

Mr. Salmon:

I would like to ask about the statement on page 60 where it says "Careful study of the data has shown that those not supplied with minerals made more rapid gain and consumed fewer peanuts per unit of gain than the others," It seems to me that the statement is misleading, hogs were not fed in cooperative lots with and without minerals.

Mr. Hankins:

It was simply two groupings; mineral and non minerals.

Mr. Russell:

Have we anything to show that if they had been in comparative lots that the mineral would have shown of benefit.

Mr. Hankins:

Although the number of hogs in each of the 2 groups is large we have wondered whether they are strictly comparable as they are grouped here. That point gave us quite a bit of worry. In fact it was worded differently before. I have questioned whether it should be put in at all. In other words if we have to say this would it be better to say nothing on that particular point. On the other hand we have so many hogs represented (a total of 316), 183 in one lot and 133 in the other.

Mr. Vestal:

I should think if there was any question about it it should be taken out as it does not pertain to the soft-pork problem.

Mr. Hankins:

As a matter of fact this mineral proposition has to be looked into very carefully in connection with several of the other feeding summaries before we go much further.

Mr. Ellis:

Probably the reason this item is given this emphasis is that sometimes they got minerals and sometimes not and when they added it up you had to divide the groups that had minerals and those that did not.

Mr. Russell:

Shall this sentence be cut out?

Motion made and seconded that the last paragraph on page 60 be omitted.

Motion carried.

Mr. Edwards:

I believe the first paragraphs on pages 1 and 2 should be rewritten.

Mr. McDowell:

I do not think that you should consider the fact that peanut pork will ever be sold at full market value.

Mr. Cocke:

It is a fact that some sections have built up a reputation on peanut-fed hogs.

Mr. McDowell:

If you try to cure and sell all the soft pork hams with that Virginia brand you will bring the market price of Virginia hams down about 50 per cent.

Mr. Cocke:

That might have a tendency to make somebody question the statement.

Mr. Hankins:

If that first statement is changed, do the next 2 or 3 paragraphs about the products meet with any objection?

Mr. Russell:

Are there any other objections to the introductory 2 pages except the first paragraph?

Mr. Salmon:

Is the second sentence "American farms" too broad?

Mr. McDowell:

It is a fact that this soft-pork problem is becoming nation-wide in the last two years.

Dr. Cole:

There is a concern here in Atlanta that is slicing bacon. They buy them from a place in Iowa and occasionally they have to turn down some of the bacon because of its being soft.

Mr. Russell:

The soft-pork problem is nation-wide. It is even getting into the Pacific coast. They have rice products and the question has been brought up out there regarding the quality of meat produced by continuous green alfalfa feeding, as explained prior in this meeting that this question was being taken up.

Mr. Vestal:

We have only heard of soft pork in the north and northwest for a few years.

Mr. McDowell:

I have not read this bulletin but I am informed that you do not have anything in it about the keeping qualities of soft pork. I think something should be in the bulletin regarding the fact that the Army and Navy will not buy any soft pork because it will not keep for any length of time.

Mr. Salmon:

I would like to ask another question. I wonder if the first 2 or 3 pages of the summary could not be gotten down a little, commencing on page 158. I think pages 158 and 159 should be omitted.

Mr. Hankins:

Those two pages are summary. It is an essential part of the summary of the bulletin.

Mr. Vestal:

I read this manuscript over but I did not get to make a study of it. I just wonder if there was enough said about the lines of work that are going on but not reported, to give the reader an idea of the work we are now pursuing.

Mr. Hankins:

We tried to do that. It begins on page 150.

Mr. Vestal:

That takes care of it in the body of the bulletin. Is it given in the summary?

Mr. Hankins:

Yes, on page 163 it is explained.

Mr. Russell:

Are there any other suggestions? We will now adjourn until 9:30 tomorrow morning.

Thursday Morning

Mr. Russell:

The business for the balance of the session is a report of the committee on the work done with conclusive results and recommendations for work of the coming year.

We will now hear a report from Mr. Hankins.

Mr. Hankins:

The first thing the committee took up was the consideration of the matter of releasing the press statement on soybeans and soft pork, which was discussed here day before yesterday. We considered the thing very thoroughly from all angles we think and it is my duty to report to you that we recommend the proposed press release be tabled. I suppose a word of explanation would be in order. The committee felt that inasmuch as we were not in a position to make any positive statement, based on experimental evidence, as to the maximum proportion of soybeans that can be fed as a protein supplement to corn that we were on very uncertain ground indeed to put out a recommendation the substance of which was that soybeans should be fed only as a supplement to corn. We felt that the inference that would come from it would be that if soybeans were fed only as a supplement to corn soft hogs would not be produced.

Then we took up the question of conclusions that might be drawn from experimental work done. We took up here in the conference yesterday the first one which pertained to the hardening of 85 to 115 pound peanut-fed pigs. I believe that conclusion was approved yesterday. Following are the 6 conclusions which the committee recommends:

1. Peanuts grazed or self-fed in dry lot with or without minerals to pigs starting at weights ranging from 85 to 115 pounds and making gains of approximately 40 pounds or more on that feed through a period of approximately 8 weeks will not produce firm carcasses at the usual market weight of 200 - 225 pounds attained by subsequent feeding of corn with tankage after the peanuts.

Results have shown in fact that gain on corn with tankage up to approximately 120 pounds, this maximum being produced during a feeding period of approximately 16 weeks duration, following gains of 40 pounds or more on peanuts usually will not produce hard or medium hard hogs. As the gain on peanuts increases the subsequent gain on corn with tankage necessary to produce a certain degree of firmness likewise increases.

2. Soybeans grazed alone or with minerals self-fed to pigs starting at weights ranging from 85 to 160 pounds and making at least a moderate rate of gain through a period of from 6 to 8 weeks will not produce firm carcasses in the usual case even though a subsequent gain in weight has been made by the pigs on corn with tankage double that previously made on soybeans.

3. Soybeans grazed with a supplementary ration of 2-1/2% of shelled corn with or without minerals self-fed to pigs starting at weights ranging from 85 to 115 pounds and making gains of approximately 20 to 60 pounds through a period of from 6 to 8 weeks will not produce firm carcasses in the usual case even though a subsequent gain in weight has been made by the pigs on corn with tankage equal to that previously made on the soybeans - 2-1/2% corn ration.

4. Soybeans grazed with a supplementary ration of 2-1/2% of shelled corn with or without minerals self-fed to pigs starting at weights of 115 pounds and over and making gains of approximately 40 to 90 pounds through a period of from 6 to 8 weeks will produce firm carcasses in the usual case provided a subsequent gain in weight is made on corn with tankage 1.5 times that previously made on the soybean - 2-1/2% corn ration.

5. Rice bran and tankage self-fed free choice on rye pasture or in dry lot and with or without a supplement of 5 pounds or less of skim milk per animal daily to pigs starting at weights under 100 pounds and making gains up to 100 pounds through a feeding period of from 8 to 16 weeks produce soft carcasses.

6. Rice polish and tankage self-fed free choice on oat or rye pasture or in dry lot to pigs starting at weights under 100 pounds and making gains of 35 pounds or more through a period of from 5 to 8 weeks will not

produce firm carcasses in the usual case even though a subsequent gain in weight has been made by the pigs on corn with tankage equal to that previously made on the rice polish ration.

As to publication of these we recommend that, as previously, a press notice covering the six conclusions be issued as soon as possible. In addition to that we recommend that a circular be published presenting the data and full details leading up to each of these conclusions and that that circular be published as a joint publication in the same way as the bulletin which was considered here yesterday. The committee also recommends that the two who were fortunate or unfortunate enough to be designated as the compiling committee one year ago continue their labors on the circular. That leads us to our recommendations for next year.

Peanut Feeding Work

1. (50 - 84 pound pigs to be used)

Peanuts alone grazed or self-fed 8 weeks followed by shelled corn and tankage self-fed 20 weeks.

(1st killing to be made after 8 weeks on hardening feeds and a killing to be made every 4 weeks thereafter).

Assignments

Georgia Agricultural Experiment Station
North Carolina " " "
U. S. Experiment Farm, Beltsville, Md.

2. (30 - 50 pound pigs to be used).

Peanuts alone grazed or self-fed 8 weeks followed by shelled corn and tankage self-fed 20 weeks.

(1st killing to be made after 4 weeks on hardening feeds and a killing to be made every 4 weeks thereafter).

Assignments

North Carolina Agricultural Experiment Station
Virginia " " "
U. S. Experiment Farm, Beltsville, Md.

Soybean Feeding Work

1. (125 pound pigs to be used)

Soybeans and corn (grown together) hogged-down 8 weeks.
(All hogs to be killed at the close of the experiment feeding period)

Assignments

Alabama Agricultural Experiment Station
Mississippi " " "

(3 varieties of soybeans - Mammoth Yellow, Otootan & Laredo to be hogged-down with corn in 3 different lots)

Pennsylvania Agricultural Experiment Station

(The Ebony, Manchu, Medium Green and Merko varieties to be used to study their relative palatability)

Purdue University Agricultural Experiment Station

(2 lots to be fed - one with mineral mixture self-fed, the other without mineral mixture)

Tennessee Agricultural Experiment Station
Virginia " " "
Coastal Plain " "

U. S. Experiment Farm, Beltsville, Md.

(2 lots to be fed - one with mineral mixture self-fed, the other without mineral mixture. The Haberlandt, Morse, Virginia and Wilson varieties to be used in each lot to study their relative palatability)

2. (40 pound or 70 pound pigs to be used)

Soybeans grazed supplemented by a 2-1/2% ration of shelled corn 8 weeks followed by shelled corn and tankage self-fed 12 weeks.

(1st killing to be made after 4 weeks on corn and tankage and a killing to be made every 4 weeks thereafter)

Assignments

South Carolina Agricultural Experiment Station

3. (75 pound pigs to be used)

Mixtures of ground corn and ground soybeans in the proportions of 12:1, 9:1, 6:1, and 3:1 (with a check lot on a mixture of ground corn 12 parts and tankage 1 part) self-fed in different lots to produce an average gain of approximately 150 pounds per pig. An additional lot may be fed in which tankage will replace a part of the ground soybeans in the 12:1 mixture with corn.

(All hogs to be killed at the close of the experimental feeding period)

Assignments

Purdue University Agricultural Experiment Station

4. (75 pound pigs to be used)

(a) Corn and ground soybeans self-fed, free choice, on alfalfa pasture
(b) Corn, ground soybeans and mineral mixture self-fed free choice on alfalfa pasture.
(c) Corn and tankage self-fed, free choice on alfalfa pasture.

The 3 lots outlined above are to be fed to produce an average gain of approximately 150 pounds per pig.

(All hogs to be killed at the close of the experimental feeding period)

Assignments

Purdue University Agricultural Experiment Station

5. (100 pound pigs to be used)

Mixtures of ground corn and ground soybeans in the proportions of 12:1, 9:1, 6:1 and 3:1 (with a check lot on a mixture of ground corn 12 parts and tankage 1 part) self-fed in different lots to produce an average gain of approximately 125 pounds per pig.

(All hogs to be killed at the close of the experimental feeding period)

Assignments

Purdue University Agricultural Experiment Station
U. S. Experiment Farm, Baltsville, Md.

Rice By-Products Feeding Work

1. (65 pound - 75 pound pigs to be used)

Rice polish and tankage self-fed in dry lot or in oat or rye pasture 8 weeks followed by shelled corn and tankage and brewers' rice and tankage self-fed in dry lot on oat or rye pasture 8 weeks.

(All hogs to be killed at the close of the experimental feeding period)

Assignments

Arkansas Agricultural Experiment Station Iberia Live Stock Experiment Farm	Hardening feeds- Corn and tankage
Arkansas Agricultural Experiment Station Iberia Live Stock Experiment Farm	Hardening feeds- Brewers' rice and tankage

2. (65 pound - 75 pound pigs to be used)

Rice bran and tankage self fed in dry lot or on oat or rye pasture 8 weeks followed by shelled corn and tankage and brewers' rice and tankage self-fed in dry lot on oat or rye pasture 8 weeks.

(All hogs to be killed at the close of the experimental feeding period)

Assignments

Arkansas Agricultural Experiment Station	Hardening feeds- Corn and tankage
Arkansas Agricultural Experiment Station	Hardening feeds- Brewers' rice and tankage

Corn, Peanut and Sweet Potato Grazing Work

1. (100 pound pigs to be used)

Corn, peanuts and sweet potatoes, grazed free choice, for approximately 8 weeks.

(All hogs to be killed at the close of the experimental feeding period)

Assignments

Virginia Agricultural Experiment Station
Coastal Plain Experiment Station

It was agreed that in connection with each experiment, or whenever possible a check lot should be fed on corn and tankage, using as many pigs as available. All pigs fed in the check lot should be killed at the close of the experiment or killings of representatives made at such times during the experiment as seem necessary.

It is understood that pigs having an initial weight of approximately 100 pounds will be used in all cooperative experiments conducted during the year 1925-26 except in cases where provision is specifically made for a different weight. The 100 pound pigs should be not more than 6 - 7 months of age.

In accordance with the plan which has been followed for several years it is understood that 3 representative pigs will be slaughtered at the beginning of each experiment as "checks". Further a sufficient number of pigs is to be used in each lot to provide for a minimum of 3 in each killing during the course of the experiment.

The committee recommends that the Washington office designate the mineral mixture to be used in all experiments along each line.

Dr. Ellinger:

I am very much disappointed with this. We are all up against the problem in the packing industry that something has to be done in order to check the loss incurred by what we think is caused by soybean feed. I was able at the last committee meeting to postpone any action until this conference had been held, but I am quite sure that it can not be deferred very much longer. Just what action will be taken I do not know. It may be a warning that was suggested in the press release here or it may be that some action will be taken similar to the one that was taken earlier down in the south, that all hogs coming from certain areas will be considered soft. It seems to me that it would be very much worth while to avoid any action of this kind. I feel that while, of course, the results so far obtained do not give the final word on soybeans we may never get to the point that we feel absolutely the last word is said. The farmer does not know in most cases. I recall a little incident out in Ames where there was a soybean meeting staged by the agronomy people. The people who staged it said to Mr. Evvard, "You won't mind if we do not invite you to speak at this meeting." He came back afterward and said he was afraid they were going to ask him about soft pork.

I think that the issuance of such a release can be made safely and it would accomplish some good and it may avoid evils.

Mr. Russell:

I might state in that connection and for the information of Dr. Ellinger and others here that the extension service at Washington sent out to the various State directors of extension a statement something along this line and of course, it is optional to the extension service to use it. Some states are going to use it and others are not.

I had something to do with writing this up and I had something to do in suggesting that a press notice from Washington be sent out. I think I can see the side of this committee and this meeting for not wanting to put out a notice of this kind. What we have so far put out and what has always been our policy in making statements has been to confine them to conclusions based on actual experiments. If we would adhere to that course a statement such as has been suggested would not be proper.

The recommendations are open to discussion, suggestions or whatever action you may see fit to take.

Mr. Hostetler:

I would like to make a motion to adopt these as they are suggested.

Mr. Russell:

Motion made and seconded that the conclusions and recommendations as they have already been stated by the chairman of the committee be adopted as a whole.

Have you any suggestions on any of the various recommendations?

Those favoring the approval of the conclusions and recommendations will signify by saying "I", contrary "No". It is carried.

I notice in most of the recommendations the number of pigs is not specified. Of course, it is impossible to make that definite at this time but the general inference is that we use all we can spare.

Mr. Hankins:

Most of the hogging-down of corn and soybeans will be done in carload lots.

Mr. Russell:

I would like to suggest that in so far as we can to arrange our tests to ship to Beltsville in car loads. It is going to save us quite a bit of money. On the other hand we want to use our funds to the very best advantage and where it is necessary to ship by express we are going to do so. We are hoping to get as many carload shipments as possible. Are there any suggestions?

Mr. Vestal:

It just occurred to me and I would like to raise the question in regard to the advisability of having a check lot on corn and tankage. I believe it was at the last meeting that it was taken up that we should have a check lot on corn and tankage when possible.

Mr. Hankins:

That I believe was incorporated in the report a year ago. We realize the desirability of having a check lot on all experiments. At the same time we have, as you all know, established, as we think, pretty definitely just what condition of firmness may be expected at any particular weight in corn-fed hogs, so that we really have something that is reliable to check against. It is not as important as it would be if we did not have this pretty well established.

Mr. Vestal:

It has its great value in interpreting results in individual shipments.

Mr. Russell:

I think it is very helpful where possible. I fell sure that a check lot is advisable.

Mr. Salmon:

In the check lot hogging corn and soybeans would not it be better to use corn and tankage fed right in the fields?

Mr. Hankins:

I think it would.

Mr. Hostetler:

I have this to say about our experiment that I do not know whether we will have the medium-weight pigs, but I will make a stremuous effort to get them.

Mr. Russell:

I think we should always keep in mind that when the pigs are put on test they should be good thrifty pigs that are not stunted. We do not want any stunted pigs in our experimental lots.

If there are no objections we will adopt the report as made by the committee. The report of the committee is adopted.

There is one little matter that has already been mentioned that I think is well to call your attention to at this time. I do not know as it is necessary to adopt it as a recommendation from the committee. That is if it is possible to follow some hogs we know had had corn and beans hogged down and get fat samples in carload or less than carload lots. I think it would be of valuable assistance to us. In Mr. Vestal's state I think there are more of that kind than in any other state. I am going to make this suggestion, that men who are attending this meeting take this matter up with their extension swine men who are naturally in position to know more about this part than anyone else and find, if we can, where there is a carload of hogs going into any market that they be followed. If they would let us know in Washington when a carload of hogs was going to any particular point close to us it is possible that some of us might be able to go and look at the shipment and grade the hogs when they come out of the cooler and get fat samples which I think would be mighty good information to have.

Is there any objection to this plan?

Dr. Ellinger:

We are planning to make a test. I think where the station men know what the hogs are fed on it would be a valuable plan to have the packers do this work for us.

Mr. Russell:

I think it would be quite valuable if when some of these carload lots were slaughtered some of us used to grading could get to the packing plant and grade them out of the cooler. I am just going to ask that if any of you gentlemen know of a carload of this kind at any particular time to let us know and some of us will try to be there.

Another matter I want to bring up at this time. That is who will represent you next year on the grading committee. The department furnishes one member, the Institute of American Meat Packers furnishes one and the co-operating stations furnish one. Now it is up to you to select whom you please. Motion made and seconded that Mr. E. H. Hostetler continue to serve on the grading committee. Carried.

Is there anything else to bring before the meeting? If not, we are ready to adjourn but before that I just want to make one or two statements. There is one thing about the manuscript that has been submitted here for publication. We brought the matter up yesterday and as you know you O. K'd it. We do not want you to get the idea that because that action was taken that if in reading over this manuscript further, and giving it further study, you see something that needs attention, you are barred from making suggestions. You are not. From our viewpoint it is wide open as far as suggestions are concerned. For the benefit of a few who are new in the meeting I just want to say that we have always regarded these meetings and the information given and discussed, which you see has been perfectly wide open, as confidential and not for the information of others who are not engaged directly with the work. As far as I know it has been kept that way. We have a lot of valuable information but it is not for the general public but for our own use and for publication in so far as this publication is authorized by the members present. As soon as we can after getting home a report the same as we got out last year and the year before will be mailed you.

On behalf of the department I just want to say that we are mighty glad to have as full an attendance as we have had. We are sorry that two of our cooperating stations could not be represented. We feel that the work has been extremely satisfactory and the fact that two or three times as many conclusions have been reported as were in any previous meeting shows we are getting some place. It is the first successful attempt that has ever been made to carry on cooperative experiments of any size and it is of considerable magnitude. The results we are obtaining certainly can not help but be pleasing to every one of you who are taking a part in these investigations.

We will now adjourn until next year.

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